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high surface area mixed conductive electrodes (100 to 1.000 M^2/g) seen in FIG. 7. fast CO reaction kinetics at the interface are achieved and strong signal response is obtained.

While the inventive gas sensor can be used to measure CO 5 concentration, it is also capable of measuring other gases such as H₂, H₂S, H₂O vapor alcohol, and NO_x concentrations.

Various protonic conductors, including organic protonic conductors and inorganic protonic conductors, can be used in the sensor according to this invention. In what follows, a copolymer protonic conductive membrane based on a tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing sulfonic acid group is used herein as an example of the fabrication of the inventive sensor.

To prevent deterioration of the polymer membrane in the subsequent wetting/drying steps, the membrane must be first converted from the proton form to the sodium form by the following steps A:

- A. The polymer membrane is soaked in lightly boiling dilute NaOH solution for 1-3 hours. It is then rinsed first in tap water for 0.5-3 hours, then in deionized water for 10-30 minutes, and is then laid out on a rack to air dry.
- B. The materials for the preferred mixed conduction electrodes are as follows: Pt/carbon powder, carbon powder, Ru oxide powder, solubilized polymer solution, Glycerol, NaOH solution, and deionized water.
- C. The steps for fabrication are as follows:
 - Pre-mix deionized water and glycerol in 20-30% weight ratio, and store the mixture in a container;
- Weigh an appropriate amount of Pt/carbon powder into a clean container:
- Weigh an appropriate amount of 5% wt polymer solution, and add to material in step C.2, and then mix. Typically, add 1-3 parts 5% wt NAFION™ solution (on a dry polymer basis) to 3-5 parts Pt/carbon powder;
- Weigh and add an appropriate amount of water/ glycerol mixture to mixture in step C.3, and then mix. Typically, add 25-35 parts water/glycerol mixture to one part Pt/carbon powder;
- 5. Weigh and add an appropriate amount of 1-2 Moles 45 NaOH to the mixture in step C.4, and then mix. Typically, add 1-2 parts 1-2 Moles NaOH to 9-15 parts 5% wt polymer solution; and further mix the wet electrode mixture ultrasonically for 60 minutes.

For Carbon/Ru Oxide electrode preparation, the following so steps are taken:

- Pre-mix the deionized water and glycerol in 20-30% weight ratio, store the mixture in a container, and set aside;
- Weigh an appropriate amount of carbon powder and 55 Ru oxide into a clean container:
- Weigh an appropriate amount of 5% wt polymer solution, and add to the material in step D.2, and then mix. Typically, add 1-3 parts 5% wt polymer solution (on a dry polymer basis) to 3-5 parts carbon/Ru 60 oxide powder;
- Weigh and add an appropriate amount of water/ glycerol mixture to mixture in step D.3, and then mix. Typically, add 25-35 parts water/glycerol mixture to 1 part carbon/Ru oxide powder;
- Weigh and add an appropriate amount of 1-2 Moles NaOH to the mixture in step C.4, and then mix.

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Typically, add 1 part 1-2 Moles NaOH to 9-15 parts 5% wt polymer solution; and further mix the wet electrode mixture ultrasonically for 60 minutes.

- E. For Pt/Carbon Electrode application drying, the following steps are taken:
 - Re-mix the wet electrode mixture ultrasonically for at least 30 minutes prior to use;
 - 2. Fill the dispensing machine tubing with the Pt/carbon wet electrode mixture;
 - 3. Dispense the wet electrode mixture to the surface of the membrane at the desired location; and
 - 4. Place the membrane/electrode in an oven at 100°-170° C. for 10-60 minutes.
- F. For Carbon/Ru Oxide Electrode application drying, the following steps are taken:

Repeat step A on the opposite side of the membrane.

- G. For acidification, the following steps are taken:
 - For Ion-Exchange, soak membrane/electrodes in lightly boiling dilute MH2S04 solution for 1-3 hours.
 - For cleaning, rinse the membrane/electrodes in deionized water;
 - For drying, dry the membrane/electrodes in air, or air dry then desiccate overnight, or place in a 30°-50° C. oven for 1-3 hours before cutting to the final dimensions.

The present invention may be embodied in other specific forms without departing from its spirit or essential characteristics. The described embodiments are to be considered in all respects only as illustrated and not restrictive. The scope of the invention is, therefore, indicated by the appended claims rather than by the foregoing description. All changes which come within the meaning and range of equivalency of the claims are to be embraced within their scope.

What is claimed and desired to be secured by United States Letters Patent is:

- 1. An electrochemical gas sensor for quantitative measurement of a gas in a ambient atmosphere comprising:
- a sensing electrode permeable to water vapor and comprised of an electrical conducting material and having a surface exposed to the ambient atmosphere;
- a counter electrode permeable to water vapor and comprised of an electrical conducting material;
- a first protonic conductive electrolyte membrane permeable to water vapor and situated between and in contact with the sensing and counter electrodes, the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode;
- means for electrical measurement electrically connected to said sensing and counter electrodes;
- means, containing a volume of water vapor, for exposing a surface of said counter electrode to said water vapor, wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material; whereby, in a positive ambient atmosphere concentration of said gas, said electrical measurement means detects changes in said electrical characteristic.
- The electrochemical gas sensor as defined in claim 1. wherein said water vapor containing means contains a volume of water and an antifreeze additive.
- 3. The electrochemical gas sensor as defined in claim 1, wherein the surface of said sensing electrode that is exposed

to the ambient atmosphere has a surface area that is smaller than the surface area of the surface of the counter electrode that is exposed to said water vapor, whereby the first protonic conductive electrolyte membrane is exposed to substantially 100 percent relative humidity, and a positive 5 pressure of said water vapor exists from the surface of said counter electrode exposed to said water vapor to the surface of said sensing electrode exposed to the ambient atmosphere.

- 4. The electrochemical gas sensor as defined in claim 3. 10 wherein the surface area of the surface of the counter electrode that is exposed to said water vapor is separated from said means for exposing a surface of said counter electrode to said water vapor by a hydrophobic membrane permeable to water vapor and substantially impervious to 15 water.
- 5. The electrochemical gas sensor as defined in claim 1. wherein the first protonic conductive electrolyte membrane has opposing surfaces, each of said opposing surfaces being in contact with one of the sensing and counter electrodes, 20 wherein at least one of the opposing surfaces of said first protonic conductive electrolyte membrane in contact with one of the sensing and counter electrodes is substantially
- 6. The electrochemical gas sensor as defined in claim 1, 25 wherein at least one of the sensing and counter electrodes is comprised of film having a thickness in the range of about 50 Angstroms to 10,000 Angstroms.
- 7. The electrochemical gas sensor as defined in claim 6. wherein the film is substantially composed of a noble metal. 30
- 8. The electrochemical gas sensor as defined in claim 7. wherein the noble metal is platinum.
- 9. The electrochemical gas sensor as defined in claim 1, wherein the first protonic conductive electrolyte membrane is substantially composed of a solid, perfluorinated, ion- 35 wherein the proton conductor material for both the first and exchange polymer.
- 10. The electrochemical gas sensor as defined in claim 1, wherein the first protonic conductive electrolyte membrane is a hydrated metal oxide protonic conductor electrolyte
- 11. The electrochemical gas sensor as defined in claim 1. wherein the proton conductor material for said at least one of the sensing and counter electrodes is a copolymer having a tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid 45 1 to 50 wt % of platinum. group or a carboxylic acid group.
- 12. The electrochemical gas sensor as defined in claim 1, wherein one of the first and second electrical conductor materials for said at least one of the sensing and counter electrodes is about 50-99 wt % of carbon black, and the 50 other of the first and second electrical conductor materials for said at least one of the sensing and counter electrodes is about 1-50 wt % of platinum.
- The electrochemical gas sensor as defined in claim 1. wherein one of the first and second electrical conductor 55 materials for said at least one of the sensing and counter electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing and counter electrodes is about 1-50 wt % of Ru oxide.
- 14. The electrochemical gas sensor as defined in claim 1. wherein the electrochemical gas sensor further comprises:
 - first and second pump electrodes comprised of an electrical conducting material permeable to water vapor. separate from said sensing and counter electrodes, and 65 situated on opposite sides of and in contact with said first protonic conductive electrolyte membrane, said

second pump electrode being situated on the same side of said first protonic conductive membrane as the counter electrode and having a surface thereon exposed to the water vapor in said means for exposing a surface of said counter electrode to said water vapor; and

means for applying a DC power across the first protonic conductive electrolyte membrane, said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across the first protonic conductive electrolyte membrane;

whereby the gas is transported away from the counter electrode when the DC power means applies a DC power to the first and second pump electrodes.

15. The electrochemical gas sensor of claim 14, wherein the electrical conducting material of the first and second pump electrodes is substantially composed of carbon.

16. The electrochemical gas sensor as defined in claim 14, wherein the electrical conducting material of the first and second pump electrodes is substantially composed of noble metals.

17. The electrochemical gas sensor as defined in claim 14, wherein the electrical conducting material of the first and second pump electrodes is substantially composed of conductive hydrated metal oxides.

18. The electrochemical gas sensor as defined in claim 14, wherein at least one of the first and second pump electrodes is comprised of a film having a thickness in the range of about 50 Angstroms to 10,000 Angstroms.

19. The electrochemical gas sensor as defined in claim 14, wherein the electrical conducting material of said first and second pump electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material.

20. The electrochemical gas sensor as defined in claim 19. second pump electrodes is a copolymer having a tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group.

21. The electrochemical gas sensor as defined in claim 19. wherein one of the first and second electrical conductor materials for the first pump electrode is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for the first pump electrode is

The electrochemical gas sensor as defined in claim 19. wherein one of the first and second electrical conductor materials for the second pump electrode is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for the second pump electrode is 1 to 50 wt % of Ru oxide.

23. The electrochemical gas sensor as defined in claim 1, wherein the electrochemical gas sensor further comprises:

a second protonic conductive electrolyte membrane permeable to water vapor;

first and second pump electrodes permeable to water vapor and comprised of an electron conductive material, and being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane, said means for exposing a surface of said counter electrode to said water vapor exposing a surface of said second pump electrode to said water vapor, and said first pump electrode having a surface exposed to the ambient atmosphere; and

means for applying a DC power across said second protonic electrolyte membrane, said first and second

pump electrodes having in electrical connection therebetween said means for applying DC power across said second protonic electrolyte membrane;

whereby the gas is transported away from the counter electrode when the DC power means applies a DC 5 power to the first and second pump electrodes.

24. The electrochemical gas sensor as defined in claim 23. wherein the second protonic conductive electrolyte membrane is substantially composed of a solid, perfluorinated, ion-exchange polymer.

25. The electrochemical gas sensor as defined in claim 23. wherein the second protonic conductive electrolyte membrane is a hydrated metal oxide protonic conductor electrolyte membrane.

26. The electrochemical gas sensor as defined in claim 23. 15 wherein the surface area of the surface of said first pump electrode that is exposed to the ambient atmosphere is smaller than the surface area of the surface of the second pump electrode that is exposed to said water vapor, whereby the second protonic conductive electrolyte membrane is 20 exposed to substantially 100 percent relative humidity, and a positive pressure of said water vapor exists from the surface of said second pump electrode that is exposed to said water vapor to the surface of said first pump electrode that is exposed to the ambient atmosphere.

27. The electrochemical gas sensor as defined in claim 26, wherein the surface area of the surface of the second pump electrode that is exposed to said water vapor is separated from said means for exposing a surface of said counter electrode to said water vapor by a hydrophobic membrane 30 permeable to water vapor and substantially impervious to

28. The electrochemical gas sensor as defined in claim 1, further comprising:

means for applying a DC pulse power source across the 35 first protonic conductive membrane, said sensing and counter electrodes having in electrical connection therebetween said means for applying DC pulse power across the first protonic conductive membrane; and

switch means for alternating the connection between the sensing and counter electrodes from the electrical measurement means to the DC pulse power means;

whereby, in a positive ambient atmosphere concentration changes in said electrical characteristic when said switch means connects said electrical measurement means to the sensing and counter electrodes; and

whereby said DC pulse power means moves the gas away from a side of the gas sensor where the counter elec- 50 trode is placed when said switch means connects said DC pulse power means to the sensing and counter electrodes.

29. The electrochemical gas sensor as defined in claim 1. wherein the gas is CO.

30. The electrochemical gas sensor as defined in claim 1. wherein the gas is NO,

31. The electrochemical gas sensor as defined in claim 1. wherein the gas is hydrogen.

32. The electrochemical gas sensor as defined in claim 1. 60

wherein the gas is H2S. 33. The electrochemical gas sensor as defined in claim 1. wherein the gas is H2O vapor.

34. The electrochemical gas sensor as defined in claim 1. wherein the gas is alcohol vapor.

35. An electrochemical gas sensor for quantitative measurement of a gas in an ambient atmosphere comprising:

a sensing electrode permeable to water vapor and comprised of an electrical conducting material and having a surface exposed to the ambient atmosphere;

a counter electrode permeable to water vapor and comprised of an electrical conducting material;

a first protonic conductive electrolyte membrane permeable to water vapor and situated in between and in contact with the sensing and counter electrodes, the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode;

a second protonic conductive electrolyte membrane permeable to water vapor;

first and second pump electrodes permeable to water vapor and comprised of an electrical conductive material, and being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane;

means, containing a volume of water vapor, for exposing a surface of said second pump electrode to said water vapor, and said first pump electrode having a surface exposed to the ambient atmosphere, said second pump electrode being separated from said counter electrode by said means for exposing a surface of said second pump electrode to said water vapor, and said counter electrode having a surface exposed to said water vapor by said means for exposing a surface of said second pump electrode to said water vapor;

means for electrical measurement in electrical communication with said sensing electrode and said counter electrode: and

means for applying a DC power across said second protonic electrolyte membrane in electrical contact with said first and second pump electrodes;

whereby the gas is transported away from the counter electrode when the DC power means applies a DC power across said second protonic electrolyte membrane: and

whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic.

36. The electrochemical gas sensor as defined in claim 35. of said gas, said electrical measurement means detects 45 wherein at least one of said first and second protonic conductive electrolyte membranes is substantially comprised of a solid, perfluorinated, ion-exchange polymer.

37. The electrochemical gas sensor as defined in claim 35. wherein at least one of the first and second protonic conductive electrolyte membranes is a hydrated metal oxide protonic conductor electrolyte membrane.

38. The electrochemical gas sensor as defined in claim 35, wherein the surface of said first pump electrode that is exposed to the ambient atmosphere has a surface area smaller than the surface area of the surface of the second pump electrode that is exposed to said water vapor, and wherein the surface of said sensing electrode that is exposed to the ambient atmosphere has a surface area smaller than the surface area of the surface of the counter electrode that is exposed to said water vapor, whereby the first protonic conductive electrolyte membrane is exposed to substantially 100 percent relative humidity, a positive pressure of said water vapor exists from the surface of said counter electrode that is exposed to said water vapor to the surface of said sensing electrode that is exposed to the ambient atmosphere, the second protonic conductive electrolyte membrane is exposed to substantially 100 percent relative humidity, and 21

a positive pressure of said water vapor exists from the surface of said second pump electrode that is exposed to said water vapor to the surface of said first pump electrode that is exposed to the ambient atmosphere.

- 39. The electrochemical gas sensor as defined in claim 38. 5 wherein the surface area of each of the surfaces of the second pump and counter electrodes that are exposed to said water vapor by said means for exposing a surface of said second pump electrode to said water vapor are each separated from said means for exposing a surface of said second pump electrode to said water vapor by a hydrophobic membrane permeable to water vapor and substantially impervious to water.
- 40. The electrochemical gas sensor as defined in claim 35. wherein said means for exposing a surface of said second pump electrode to said water vapor further contains an 15 antifreeze additive.
- 41. The electrochemical gas sensor as defined in claim 35, wherein at least one of the surfaces of said first protonic conductive electrolyte membrane in contact with one of the sensing and counter electrodes is substantially nonplanar, 20 and wherein at least one of the surfaces of said second protonic conductive electrolyte membrane in contact with one of the first and second pump electrodes is substantially nonplanar.
- 42. The electrochemical gas sensor as defined in claim 35, 25 wherein at least one of the sensing, counter, first pump, and second pump electrodes is comprised of film having a thickness in the range of about 50 Angstroms to 10,000 Angstroms.
- 43. The electrochemical gas sensor as defined in claim 42. 30 wherein the film is substantially composed of a noble metal.
- 44. The electrochemical gas sensor as defined in claim 43. Wherein the noble metal is platinum.
- 45. The electrochemical gas sensor as defined in claim 35, wherein the at least one of the sensing, counter, first pump, 35 and second pump electrodes is substantially comprised of proton conductive material.
- 46. The electrochemical gas sensor as defined in claim 35, wherein at least one of the first and second protonic conductive electrolyte membranes is substantially comprised of 40 a solid, perfluorinated, ion-exchange polymer.
- 47. The electrochemical gas sensor as defined in claim 35, wherein at least one of the first and second protonic conductive electrolyte membranes is a hydrated metal oxide protonic conductive electrolyte membrane.
- 48. The electrochemical gas sensor as defined in claim 35, wherein the electrical conducting material of at least one of said sensing, counter, first pump, and second pump electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % 50 of a first and a second electrical conductor material.
- 49. The electrochemical gas sensor as defined in claim 48, wherein the proton conductor material for said at least one of the sensing, counter, first pump, and second pump electrodes is a copolymer having a tetrafluoroethylene backbone 55 with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group.
- 50. The electrochemical gas sensor as defined in claim 48, wherein one of the first and second electrical conductor materials for said at least one of the sensing, counter, first 60 pump, and second pump electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing, counter, first pump and second pump electrodes is about 1-50 wt % of platinum.
- 51. The electrochemical gas sensor as defined in claim 48, wherein one of the first and second electrical conductor

materials for said at least one of the sensing, counter, first pump, and second pump electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing, counter, first pump, and second pump electrodes is about 1-50 wt % of Ru oxide.

- 52. An electrochemical gas sensor for quantitative measurement of a gas in an ambient atmosphere comprising:
- a sensing electrode permeable to water vapor and comprised of an electrical conducting material and being exposed to the ambient atmosphere;
 - a reference electrode permeable to water vapor and comprised of an electrical conducting material;
- a counter electrode permeable to water vapor and comprised of an electrical conducting material and being separate from both said sensing and reference electrodes, and being exposed to the ambient atmosphere;
- a protonic conductive electrolyte membrane permeable to water vapor, having top and bottom sides, said bottom side of said protonic conductive membrane being in contact with the counter electrode, and the top side of said protonic conductive membrane being in contact with the sensing and reference electrodes;
- means, containing a volume of water vapor, for exposing a surface of said counter electrode to said water vapor, the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode; and
- means for electrical measurement in electrical contact between the sensing electrode and the counter electrode, wherein the electrical conducting material of at least one of said sensing, counter, and reference electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material:
- whereby, in a positive ambient concentration of said gas, said electrical measurement means detects changes in said electrical characteristic.
- 53. The electrochemical gas sensor as defined in claim 52, further comprising:
- means for applying a DC power across said protonic electrolyte membrane in electrical contact between the sensing electrode and said counter electrode, whereby the gas is transported away from the counter electrode when the DC power means applies a DC power across said protonic electrolyte membrane.
- 54. The electrochemical gas sensor as defined in claim 52, wherein said means for exposing a surface of said counter electrode to said water vapor further contains an antifreeze additive.
- 55. The electrochemical gas sensor as defined in claim 52, wherein the surface of said sensing electrode that is exposed to the ambient atmosphere has a surface area smaller than the surface area of the surface of the counter electrode that is exposed to said water vapor, whereby the first protonic conductive electrolyte membrane is exposed to substantially 100 percent relative humidity, and a positive pressure of said water vapor exists from the surface of said counter electrode that is exposed to said water vapor to the surface of said sensing electrode that is exposed to the ambient atmosphere.
- 56. The electrochemical gas sensor as defined in claim 55, wherein the surface area of the surface of the counter electrode that is exposed to said water vapor is separated from said means for exposing a surface of said counter

electrode to said water vapor by a hydrophobic membrane permeable to water vapor and substantially impervious to

57. The electrochemical gas sensor as defined in claim 52. wherein at least one of the surfaces of said protonic con- 5 ductive electrolyte membrane in contact with one of the sensing, counter, and reference electrodes is substantially nonplanar.

58. The electrochemical gas sensor as defined in claim 52. electrodes is comprised of film having a thickness in the range of about 50 Angstroms to 10.000 Angstroms.

59. The electrochemical gas sensor as defined in claim 58, wherein the film is substantially composed of a noble metal.

60. The electrochemical gas sensor as defined in claim 59, 15 wherein the noble metal is platinum.

The electrochemical gas sensor as defined in claim 52, wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ionexchange polymer.

62. The electrochemical gas sensor as defined in claim 52, wherein the protonic conductive electrolyte membrane is a hydrated metal oxide protonic conductor electrolyte membrane.

63. The electrochemical gas sensor as defined in claim 52. wherein the proton conductor material for said at least one of the sensing, counter, and reference electrodes is a copolymer having a tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group.

64. The electrochemical gas sensor as defined in claim 52. wherein one of the first and second electrical conductor wherein at least one of the sensing, counter, and reference 10 materials for said at least one of the sensing, counter, and reference electrodes is about 50-99 wt % of carbon black. and the other of the first and second electrical conductor materials for said at least one of the sensing, counter, and reference electrodes is about 1-50 wt % of platinum.

> 65. The electrochemical gas sensor as defined in claim 52. wherein one of the first and second electrical conductor materials for said at least one of the sensing, counter, and reference electrodes is about 50-99 wt % of carbon black. and the other of the first and second electrical conductor materials for said at least one of the sensing, counter, and reference electrodes is about 1-50 wt % of Ru oxide.

			
Differences in Claim Language	Unlike original patent claim 1, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 2, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 2, presented reissue claim 66 does not recite the language "wherein said water vapor containing means contains a volume of water and an antifreeze additive."
Original Presented Patent Claim Reissue Claim	99	99	
Original Patent Claim	1	7	

Differences in Claim Language	Unlike original patent claim 9, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 9, presented reissue claim 66 does not recite the language "wherein the first protonic conductive electrolyte membrane is substantially composed of a solid, perfluorinated, ion-exchange polymer."	Unlike original patent claim 10, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 10, presented reissue claim 66 does not recite the language "wherein the first protonic conductive electrolyte membrane is a hydrated metal oxide protonic conductor electrolyte membrane."
Presented Reissue Claim	99		99	
Original Patent Claim	6		10	

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
13	99	Unlike original patent claim 13, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 13, presented reissue claim 66 does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing and counter electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing and counter electrodes is about 1-50 wt % of Ru oxide."
14	99	Unlike original patent claim 14, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 14, presented reissue claim 66 does not recite the language "wherein the electrochemical gas sensor further comprises: first and second pump electrodes comprised of an electrical conducting material permeable to water vapor, separate from said sensing and counter electrodes, and situated on opposite sides of and in contact with said first protonic conductive electrolyte membrane, said second pump electrode being situated on the same side of said first protonic conductive membrane as the counter electrode and having a surface thereon exposed to the water vapor in said means for applying a DC power across the first protonic conductive electrolyte membrane, said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across the first protonic conductive electrolyte membrane; whereby the gas is transported away from the counter electrode when the DC power means applies a DC power to the first and second
		pump electrodes."

Differences in Claim Language		Unlike original patent claim 15, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first motoric	and the counter electrody being the only two electrodies in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 15, presented reissue claim 66 does not recite the language "wherein the electrical conducting material of the first and second pump electrodes is	substantially composed of carbon."	Unlike original patent claim 16, presented reissue claim 66 recites the language "a two- electrode electrochemical gas sensor" and also recites the language "the sensing electrode	and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 16, presented reissue claim 66 does not recite the language "wherein the electrical conducting material of the first and second pump electrodes is	substantially composed of noble metals."
Presented	Reissue Claim	99				99			
Original	Patent Claim	. 15				16			

Differences in Claim Language	Unlike original patent claim 17, presented reissue claim 66 recites the language "a two-electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 17, presented reissue claim 66 does not recite the language "wherein the electrical conducting material of the first and second pump electrodes is substantially composed of conductive hydrated metal oxides."	Unlike original patent claim 18, presented reissue claim 66 recites the language "a two- electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 18, presented reissue claim 66 does not recite the language "wherein at least one of the first and second pump electrodes is comprised of a film having a thickness in the range of about 50 Angstroms to 10,000 Angstroms."
Presented Reissue Claim	99		99	
Original Patent Claim	17		18	

d Differences in Claim Language	Unlike original patent claim 21, presented reissue claim 66 recites the language "a two- electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 21, presented reissue claim 66 does not recite the language "wherein one of the first and second electrical conductor materials for the first pump electrode is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for the first pump electrode is 1 to 50 wt % of platinum."	Unlike original patent claim 22, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 22, presented reissue claim 66 does not recite the language "wherein one of the first and second electrical conductor materials for the second pump electrode is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for the second pump electrode is 1 to 50 wt % of Ru oxide."
Presented Reissue Claim	99		99	
Original Patent Claim	21		22	

Differences in Claim Language	Unlike original patent claim 23, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 23, presented reissue claim 66 does not recite the language "wherein the electrochemical gas sensor further comprises: a second protonic conductive electrolyte membrane permeable to water vapor; first and second pump electrodes permeable to water vapor and comprised of an electron conductive material, and being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane, said means for exposing a surface of said counter electrode to said water vapor exposing a surface of said second pump electrode to said water vapor, and said first pump electrode having a surface exposed to the ambient atmosphere; and means for applying a DC power across said second protonic electrolyte membrane, said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across said second protonic electrolyte membrane; whereby the gas is transported away from the counter electrode when the DC power means applies a DC power to the first and second pump electrodes."	Unlike original patent claim 24, presented reissue claim 66 recites the language "a two- electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 24, presented reissue claim 66 does not recite the language "wherein the second protonic conductive electrolyte membrane is substantially composed of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	99		99
Original Patent Claim	23		24

Differences in Claim Language	Unlike original patent claim 25, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 25, presented reissue claim 66 does not recite the language "wherein the second protonic conductive electrolyte membrane is a hydrated metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 26, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 26, presented reissue claim 66 does not recite the language "wherein the surface area of the surface of said first pump electrode that is exposed to the ambient atmosphere is smaller than the surface area of the surface of the second pump electrode that is exposed to said water vapor, whereby the second protonic conductive electrolyte membrane is exposed to substantially 100 percent relative humidity, and a positive pressure of said water vapor exists from the surface of said second pump electrode that is exposed to said water vapor to the surface of said first pump electrode that is exposed to the ambient atmosphere."
Presented Reissue Claim	99		99	
Original Patent Claim	25		26	

Differences in Claim Language	Unlike original patent claim 27, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 27, presented reissue claim 66 does not recite the language "wherein the surface area of the surface of the second pump electrode that is exposed to said water vapor is separated from said means for exposing a surface of said counter electrode to said water vapor by a hydrophobic membrane permeable to water vapor and substantially impervious to water."	Unlike original patent claim 28, presented reissue claim 66 recites the language "a two- electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 28, presented reissue claim 66 does not recite the language "further comprising: means for applying a DC pulse power source across the first protonic conductive membrane, said sensing and counter electrodes having in electrical connection therebetween said means for applying DC pulse power across the first protonic conductive membrane; and switch means for alternating the connection between the sensing and counter electrodes from the electrical measurement means to the DC pulse power means; whereby, in a positive ambient atmosphere concentration of said gas, said electrical measurement means detects changes in said electrical characteristic when said switch means connects said electrical measurement means to the sensing and counter electrode is placed when said switch means connects said DC pulse power means to the sensing and counter electrodes."
Presented Reissue Claim	99		99	
Original Patent Claim	27		28	

Differences in Claim Language	Unlike original patent claim 29, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 29, presented reissue claim 66 does not recite the language "wherein the gas is CO."	Unlike original patent claim 30, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 30, presented reissue claim 66 does not recite the language "wherein the gas is NO_x ."
Presented Reissue Claim			99	
Original Patent Claim	29		30	

			
Differences in Claim Language	Unlike original patent claim 31, presented reissue claim 66 recites the language "a two-electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane." Unlike original patent claim 31, presented reissue claim 66 does not recite the language "wherein the gas is hydrogen."	Unlike original patent claim 32, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."	"wherein the gas is H ₂ S."
Presented Reissue Claim	99	99	
Original Patent Claim	31	32	

Original	Presented	Differences in Claim Language
Patent Claim	Patent Claim Reissue Claim	
33	99	Unlike original patent claim 33, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."
·		Unlike original patent claim 33, presented reissue claim 66 does not recite the language "wherein the gas is H ₂ O vapor."
34	99	Unlike original patent claim 34, presented reissue claim 66 recites the language "a two- electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 34, presented reissue claim 66 does not recite the language "wherein the gas is alcohol vapor."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
36	99	Unlike original patent claim 35, presented reissue claim 66 recites the language "a two-electrode
55	00	electrochemical gas sensor, recites the language the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane,"
		and also recites the language "wherein the electrical conducting material of at least one of said
		sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of
		a proton conductor material and 50-90 Wt % of a first and a second electrical conductor material."
		Unlike original patent claim 35, presented reissue claim 66 does not recite the language "a second
		wand said first pump electrode having a surface exposed to the ambient atmosphere, said second
		pump electrode being separated from said counter electrode by said means for exposing a surface of
		said second pump electrode to said water vapor, and said counter electrode having a surface exposed
		to said water vapor by said means for exposing a surface of said second pump electrode to said
		water vapor," and also does not recite the language "means for applying a DC power across said
		second protonic electrolyte membrane in electrical contact with said first and second pump
		electrodes; whereby the gas is transported away from the counter electrode when the DC power
		means applies a DC power across said second protonic electrolyte membrane."
		Unlike original patent claim 36, presented reissue claim 66 recites the language "a two-electrode
36	99	electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode
		being the only two electrodes in contact with the first protonic conductive electrolyte membrane,"
		and also recites the language "wherein the electrical conducting material of at least one of said
		sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of
		a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Trailing animal natest aloim 26 presented reisons aloim 66 does not regite the landings "wherein st
		Unitary of and first and second protonic conductive electrolists membranes is substantially
		comprised of a solid, perfluorinated, ion-exchange polymer."

ted Differences in Claim Language	Unlike original patent claim 37, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and	counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material." Unlike original patent claim 37, presented reissue claim 66 does not recite the language "wherein at least one of the first and second protonic conductive electrolyte membranes is a hydrated metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 38, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode	being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 38, presented reissue claim 66 does not recite the language "wherein the surface of said first pump electrode that is exposed to the ambient atmosphere has a surface area smaller than the surface area of the surface of the second pump electrode that is exposed to said water	vapor, and wherein the surface of said sensing electrode that is exposed to the ambient atmosphere has a surface area smaller than the surface area of the surface of the counter electrode that is exposed to said water vapor, whereby the first protonic conductive electrolyte membrane is exposed to	substantially 100 percent relative numifierly, a positive pressure of said water vapor exists from the surface of said counter electrode that is exposed to said water vapor to the surface of said sensing electrode that is exposed to the ambient atmosphere, the second protonic conductive electrolyte	water vapor exists from the surface of said second pump electrode that is exposed to said water vapor
Presented	Keissue Claim 66		99					
Original	Patent Claim 37		38					

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
39	99	Unlike original patent claim 39, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 39, presented reissue claim 66 does not recite the language "wherein the surface area of each of the surfaces of the second pump and counter electrodes that are exposed to said water vapor by said means for exposing a surface of said second pump electrode to said water vapor are each separated from said means for exposing a surface of said second pump electrode to said water vapor by a hydrophobic membrane permeable to water vapor and substantially impervious to water."
40	99	Unlike original patent claim 40, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material." Unlike original patent claim 40, presented reissue claim 66 does not recite the language "wherein
		said means for exposing a surface of said second pump electrode to said water vapor further contains an antifreeze additive."

Original Patent Claim	Presented Reissue Claim 66	Unlike original patent claim 41, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor." recites the language "the sensing electrode and the counter electrode
		being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material." Unlike original patent claim 41, presented reissue claim 66 does not recite the language "wherein at
		least one of the surfaces of said first protonic conductive electrolyte membrane in contact with one of the sensing and counter electrodes is substantially nonplanar, and wherein at least one of the surfaces of said second protonic conductive electrolyte membrane in contact with one of the first and second pump electrodes is substantially nonplanar."
42	99	Unlike original patent claim 42, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 42, presented reissue claim 66 does not recite the language "wherein at least one of the sensing, counter, first pump, and second pump electrodes is comprised of film having a thickness in the range of about 50 Angstroms to 10,000 Angstroms."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
43	99	Unlike original patent claim 43, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material."
		Unlike original patent claim 43, presented reissue claim 66 does not recite the language "wherein the film is substantially composed of a noble metal."
44	99	Unlike original patent claim 44, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 44, presented reissue claim 66 does not recite the language "wherein the noble metal is platinum."

Presented Differences in Claim Language Reissue Claim	Unlike original patent claim 45, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 45, presented reissue claim 66 does not recite the language "wherein the at least one of the sensing, counter, first pump, and second pump electrodes is substantially comprised of proton conductive material."	Unlike original patent claim 46, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 46, presented reissue claim 66 does not recite the language "wherein at least one of the first and second protonic conductive electrolyte membranes is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Prese Reissue	Ø		ŏ	
Original Patent Claim	45		46	

Differences in Claim Language	Unlike original patent claim 47, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conductive material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material." Unlike original patent claim 47, presented reissue claim 66 does not recite the language "wherein at least one of the first and second protonic conductive electrolyte membranes is a hydrated metal oxide protonic conductive electrolyte membrane."	Unlike original patent claim 48, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conductive material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material." Unlike original patent claim 48, presented reissue claim 66 does not recite the language "wherein the electrical conducting material of at least one of said sensing, counter, first pump, and second pump electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
Presented Reissue Claim	99	99
Original Patent Claim	47	48

Differences in Claim Language	Unlike original patent claim 49, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 49, presented reissue claim 66 does not recite the language "wherein the proton conductor material for said at least one of the sensing, counter, first pump, and second pump electrodes is a copolymer having a tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 50, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 50, presented reissue claim 66 does not recite the language wherein one of the first and second electrical conductor materials for said at least one of the sensing, counter, first pump, and second pump electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing, counter, first pump and second pump electrodes is about 1-50 wt % of platinum."
Presented Reissue Claim	99		99	
Original Patent Claim	49		50	

ed Differences in Claim Language	Unlike original patent claim 51, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 51, presented reissue claim 66 does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing, counter, first pump, and second pump electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing, counter, first pump, and second pump electrodes is about 1-50 wt % of Ru oxide."	Unlike original patent claim 52, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 52, presented reissue claim 66 does not recite the language "a reference electrode permeable to water vapor and comprised of an electrical conducting material; a counter electrode permeable to water vapor and comprised of an electrical conducting material and being separate from both said sensing and reference electrodes, and being exposed to the ambient atmosphere; a protonic conductive electrolyte membrane permeable to water vapor, having top and bottom sides, said bottom side of said protonic conductive membrane being in contact with the sensing and reference electrodes;" and also does not recite the language "wherein the electrical conducting material of at least one of said sensing, counter, and reference electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
Presented Reisene Claim	99		99	
Original Patent Claim	51		52	

Differences in Claim Language	Unlike original patent claim 53, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 53, presented reissue claim 66 does not recite the language "further comprising: means for applying a DC power across said protonic electrolyte membrane in electrical contact between the sensing electrode and said counter electrode, whereby the gas is transported away from the counter electrode when the DC power means applies a DC power across said protonic electrolyte membrane."	Unlike original patent claim 54, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 54, presented reissue claim 66 does not recite the language "wherein said means for exposing a surface of said counter electrode to said water vapor further contains an antifreeze additive."
Presented Paired	99		99	
Original Patent Claim	53		54	

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
55	99	Unlike original patent claim 55, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton
		conductor material and 20-30 wt % of a first and a second electrical conductor material. Unlike original patent claim 55, presented reissue claim 66 does not recite the language "wherein the surface of said sensing electrode that is exposed to the ambient atmosphere has a surface area smaller
		than the surface area of the surface of the counter electrode that is exposed to said water vapor, whereby the first protonic conductive electrolyte membrane is exposed to substantially 100 percent relative humidity, and a positive pressure of said water vapor exists from the surface of said counter electrode that is exposed to said water vapor to the surface of said sensing electrode that is exposed to the ambient atmosphere."
99	99	Unlike original patent claim 56, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton
		conductor material and 50-90 wt % of a first and a second electrical conductor material." Unlike original patent claim 56, presented reissue claim 66 does not recite the language "wherein at least one of the surfaces of said protonic conductive electrolyte membrane in contact with one of the sensing, counter, and reference electrodes is substantially nonplanar."

Differences in Claim Language	Unlike original patent claim 59, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 59, presented reissue claim 66 does not recite the language "wherein the film is substantially composed of a noble metal."	Unlike original patent claim 60, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 60, presented reissue claim 66 does not recite the language "wherein the noble metal is platinum."
Presented Reissue Claim	99		99	
Original Patent Claim	59		09	

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
61	99	Unlike original patent claim 61, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being
		the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton electron mixed conductive material baying 10-50 at 9, of a proton
		conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 61, presented reissue claim 66 does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-
		exchange polymer."
62	99	Unlike original patent claim 62, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also
		recites the language "wherein the electrical conducting material of at least one of said sensing and
		conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 62, presented reissue claim 66 does not recite the language "wherein the
		protonic conductive electrolyte membrane is a hydrated metal oxide protonic conductor electrolyte
		membrane."

Differences in Claim Language	Unlike original patent claim 63, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 63, presented reissue claim 66 does not recite the language "wherein the proton conductor material for said at least one of the sensing, counter, and reference electrodes is a copolymer having a tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 64, presented reissue claim 66 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 64, presented reissue claim 66 does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing, counter, and reference electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing, counter, and reference electrodes is about 1-50 wt % of platinum."
Presented Reissue Claim	99		99	
Original Patent Claim	63		64	

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
		Unlike original patent claim 65, presented reissue claim 66 recites the language "a two-electrode
65	99	electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being
		the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also
		recites the language "wherein the electrical conducting material of at least one of said sensing and
		counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton
		conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 65, presented reissue claim 66 does not recite the language "wherein one of
		the first and second electrical conductor materials for said at least one of the sensing, counter, and
		reference electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical
		conductor materials for said at least one of the sensing, counter, and reference electrodes is about 1-50
		wt % of Ru oxide."
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Differences in Claim Language	Unlike original patent claim 1, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 2, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 2, presented reissue claim 67 does not recite the language "wherein said water vapor containing means contains a volume of water and an antifreeze additive."
Original Presented Patent Claim Reissue Claim	29	<i>L</i> 9	
Original Patent Claim		2	

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
3	67	Unlike original patent claim 3, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 3, presented reissue claim 67 does not recite the language "wherein the surface of said sensing electrode that is exposed to the ambient atmosphere has a surface area that is smaller than the surface area of the surface of the counter electrode that is exposed to said water vapor, whereby the first protonic conductive electrolyte membrane is exposed to substantially 100 percent relative humidity, and a positive pressure of said water vapor to the surface of said counter electrode exposed to said water vapor to the surface of said sensing electrode exposed to the ambient atmosphere."
4	29	Unlike original patent claim 4, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
ļ		Unlike original patent claim 4, presented reissue claim 67 does not recite the language "wherein the surface area of the surface of the counter electrode that is exposed to said water vapor is separated from said means for exposing a surface of said counter electrode to said water vapor by a hydrophobic membrane permeable to water vapor and substantially impervious to water."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
\$	29	Unlike original patent claim 5, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the
)	·)	sensing electrode and the counter electrode in the absence of an applied voltage to the
		Unlike original patent claim 5, presented reissue claim 67 does not recite the language
		said opposing surfaces being in contact with one of the sensing and counter electrodes,
		wherein at least one of the opposing surfaces of said first protonic conductive electrolyte
		membrane in contact with one of the sensing and counter electrodes is substantially
		nonplanar."
		Unlike original patent claim 6, presented reissue claim 67 recites the language "the sensing
9	29	electrode reacting with the gas to produce a change in electrical characteristic between the
		sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode."
		Unlike original patent claim 6 presented reissue claim 67 does not recite the language
		"wherein at least one of the sensing and counter electrodes is commised of film having a
		thickness in the range of about 50 Angstroms to 10,000 Angstroms."

Differences in Claim Language	Unlike original patent claim 7, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 7, presented reissue claim 67 does not recite the language "wherein the film is substantially composed of a noble metal."	Unlike original patent claim 8, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 8, presented reissue claim 67 does not recite the language "wherein the noble metal is platinum."
Original Presented Patent Claim Reissue Claim	67		67	
Original Patent Claim	7		∞	

Original Patent Claim 9	Presented Reissue Claim 67	Unlike original patent claim 9, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 9, presented reissue claim 67 does not recite the language "wherein the first protonic conductive electrolyte membrane is substantially composed of a solid, perfluorinated, ion-exchange polymer." Unlike original patent claim 10, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 10, presented reissue claim 67 does not recite the language "wherein the first protonic conductive electrolyte membrane is a hydrated metal oxide protonic conductor electrolyte membrane."

Differences in Claim Language	Unlike original patent claim 11, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 11, presented reissue claim 67 does not recite the language "wherein the proton conductor material for said at least one of the sensing and counter electrodes is a copolymer having a tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 12, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 12, presented reissue claim 67 does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing and counter electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing and counter electrodes is about 1-50 wt % of platinum."
Presented Reissue Claim	<i>L</i> 9		29	
Original Patent Claim	11		12	

Original	Presented	Differences in Claim Language
ratent Claim	Keissue Ciaim	Unlike original natent claim 13 presented reisene claim 67 regites the language "the sensing
13	19	electrode reacting with the gas to produce a change in electrical characteristic between the
		sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 13, presented reissue claim 67 does not recite the language
		wherein one of the first and second electrical conductor materials for said at least one of the sensing and counter electrodes is about 50-99 wt % of carbon black, and the other of the first
		and second electrical conductor materials for said at least one of the sensing and counter
		electrodes is about 1-50 wt % of Ru oxide."
		Unlike original patent claim 14, presented reissue claim 67 recites the language "the sensing
14	29	electrode reacting with the gas to produce a change in electrical characteristic between the
		sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode."
		Unlike original patent claim 14, presented reissue claim 67 does not recite the language
		"wherein the electrochemical gas sensor further comprises: first and second pump electrodes
		comprised of an electrical conducting material permeable to water vapor, separate from said
		sensing and counter electrodes, and situated on opposite sides of and in contact with said
		first protonic conductive electrolyte membrane, said second pump electrode being situated
		on the same side of said first protonic conductive membrane as the counter electrode and
		having a surface thereon exposed to the water vapor in said means for exposing a surface of
		said counter electrode to said water vapor; and means for applying a DC power across the
		first protonic conductive electrolyte membrane, said first and second pump electrodes having
		in electrical connection therebetween said means for applying DC power across the first
	-	protonic conductive electrolyte membrane; whereby the gas is transported away from the
		counter electrode when the DC power means applies a DC power to the first and second
		pump electrodes."

Differences in Claim Language	Unlike original patent claim 15, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 15, presented reissue claim 67 does not recite the language "wherein the electrical conducting material of the first and second pump electrodes is substantially composed of carbon."	Unlike original patent claim 16, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 16, presented reissue claim 67 does not recite the language "wherein the electrical conducting material of the first and second pump electrodes is substantially composed of noble metals."
Presented Reissue Claim	67	<i>L</i> 9	
Original Patent Claim	15	16	

Differences in Claim Language	Unlike original patent claim 17, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 17, presented reissue claim 67 does not recite the language "wherein the electrical conducting material of the first and second pump electrodes is substantially composed of conductive hydrated metal oxides."	Unlike original patent claim 18, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 18, presented reissue claim 67 does not recite the language "wherein at least one of the first and second pump electrodes is comprised of a film having a thickness in the range of about 50 Angstroms to 10,000 Angstroms."
Presented Reissue Claim	67		<i>L</i> 9	
Original Patent Claim	17		18	

ed Differences in Claim Language	Unlike original patent claim 19, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 19, presented reissue claim 67 does not recite the language "wherein the electrical conducting material of said first and second pump electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 20, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 20, presented reissue claim 67 does not recite the language "wherein the proton conductor material for both the first and second pump electrodes is a copolymer having a tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	19		19	
Original Patent Claim	19		20	

Original Presented Patent Claim Unlike original patent claim 21, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 21, presented reissue claim 67 does not recite the language "wherein one of the first and second electrical conductor materials for the first pump electrode is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for the first pump electrode is 1 to 50 wt % of platinum." Unlike original patent claim 22, presented reissue claim 67 recites the language "the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	"wherein one of the first and second electrical conductor materials for the second pump electrode is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for the second pump electrode is 1 to 50 wt % of Ru oxide."
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Original Patent Claim	Presented Reissue Claim	Differences in Claim Language
23	29	Unlike original patent claim 23, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 23, presented reissue claim 67 does not recite the language "wherein the electrochemical gas sensor further comprises: a second protonic conductive electrolyte membrane permeable to water vapor; first and second pump electrodes permeable to water vapor and comprised of an electron conductive material, and being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane, said means for exposing a surface of said counter electrode to said water vapor, and said first pump electrode having a surface exposed to the ambient atmosphere; and means for applying a DC power across said second protonic electrolyte membrane, said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across said second protonic electrolyte membrane; whereby the gas is transported away from the counter electrode when the DC power means applies a DC power to the first and second pump electrodes."
24	<i>L</i> 9	Unlike original patent claim 24, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 24, presented reissue claim 67 does not recite the language "wherein the second protonic conductive electrolyte membrane is substantially composed of a solid, perfluorinated, ion-exchange polymer."

Original 25 26	Presented Reissue Claim 67	Unlike original patent claim 25, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 25, presented reissue claim 67 does not recite the language "wherein the second protonic conductive electrolyte membrane is a hydrated metal oxide protonic conductor electrolyte membrane." Unlike original patent claim 26, presented reissue claim 67 recites the language "the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 26, presented reissue claim 67 does not recite the language "wherein the surface area of the surface of said first pump electrode that is exposed to the ambient atmosphere is smaller than the surface area of the surface area of the surface area of the second protonic conductive electrode that is exposed to said water vapor, whereby the second protonic conductive electrode that is exposed to substantially 100 percent relative humidity, and a standard and a second protonic conductive detaction of the surface with the surface of said water vapor, whereby the second protonic conductive electrolyte membrane is exposed to substantially 100 percent relative humidity, and a standard or such as the surface of said for the surface of said such as the such as
		that is exposed to said water vapor to the surface of said first pump electrode that is exposed to the ambient atmosphere."

Original Pratent Claim Reis 27 28	Presented Reissue Claim 67	Unlike original patent claim 27, presented reissue claim 67 recites the language "the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 27, presented reissue claim 67 does not recite the language "wherein the surface area of the surface of the second pump electrode that is exposed to said water vapor is separated from said means for exposing a surface of said counter electrode to said water vapor is separated from said means for exposing a surface of said counter electrode to said water vapor by a hydrophobic membrane permeable to water vapor and substantially impervious to water." Unlike original patent claim 28, presented reissue claim 67 recites the language "the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 28, presented reissue claim 67 does not recite the language "further comprising, means for applying a DC pulse power source across the first protonic conductive membrane, said sensing and counter electrodes having in electrical connection therebetween said means for applying DC pulse power across the first protonic conductive membrane; and switch means for alternating the connection between the sensing and counter electrodes from the electrical measurement means of electrodes from the electrical measurement means detects changes in said electrical characteristic when said switch means to the sensing and counter electrodes; and whereby said DC pulse power means moves the gas away from a side of the gas sensor where the counter
		sensing and counter electrodes."

ented Differences in Claim Language e Claim	Unlike original patent claim 29, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 29, presented reissue claim 67 does not recite the language "wherein the gas is CO."	Unlike original patent claim 30, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 30, presented reissue claim 67 does not recite the language "wherein the gas is NO _x ."
Presented Reissue Claim	,9		.00	
Original Patent Claim	29		30	

Presented Differences in Claim Language eissue Claim	Unlike original patent claim 31, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 31, presented reissue claim 67 does not recite the language "wherein the gas is hydrogen."	Unlike original patent claim 32, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 32, presented reissue claim 67 does not recite the language "wherein the gas is H ₂ S."
~	9		9	
Original Patent Claim	31		32	

Differences in Claim Language		Unlike original patent claim 33, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 33, presented reissue claim 67 does not recite the language "wherein the gas is H ₂ O vapor."	Unlike original patent claim 34, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 34, presented reissue claim 67 does not recite the language "wherein the gas is alcohol vapor."
		Unlike or electrode sensing e	Unlike o "wherein	Unlike or electrode sensing e	Unlike or "wherein
Presented	Reissue Claim	29		29	
Original	Patent Claim	33		34	

Original Patent Claim 35	Presented Reissue Claim 67	Unlike original patent claim 35, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing
		electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 35, presented reissue claim 67 does not recite the language "a second protonic conductive electrolyte membrane permeable to water vapor;" does not recite the language "and said first pump electrode having a surface exposed to the ambient atmosphere, said second pump electrode being separated from said counter electrode by said means for exposing a surface of said second pump electrode to said water vapor, and said counter electrode having a surface exposed to said water vapor by said means for exposing a surface of said second pump electrode to said water vapor," and also does not recite the language "means for applying a DC power across said second protonic electrolyte membrane in electrical contact with said first and second pump electrodes; whereby the gas is transported away from the counter electrode when the DC power means applies a DC power across said second protonic electrolyte membrane."
36	29	Unlike original patent claim 36, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 36, presented reissue claim 67 does not recite the language "wherein at least one of said first and second protonic conductive electrolyte membranes is substantially comprised of a solid, perfluorinated, ion-exchange polymer."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
37	29	Unlike original patent claim 37, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and
		the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter
		electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 37, presented reissue claim 67 does not recite the language "wherein at least one of the first and second protonic conductive electrolyte membranes is a hydrated metal oxide
		protonic conductor electrolyte membrane."
		Unlike original patent claim 38, presented reissue claim 67 recites the language "the sensing electrode
38	<i>L</i> 9	reacting with the gas to produce a change in electrical characteristic between the sensing electrode and
		the counter electrode in the absence of an applied voltage to the sensing electrode, and also recites
		the language "wherein the electrical conducting material of at least one of said sensing and counter
		electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor
		matchal and 20-70 Wt /6 of a first and a second clocation conducted matchal.
		Unlike original patent claim 38, presented reissue claim 67 does not recite the language "wherein the
		surface of said first pump electrode that is exposed to the ambient atmosphere has a surface area
		smaller than the surface area of the surface of the second pump electrode that is exposed to said water
		vapor, and wherein the surface of said sensing electrode that is exposed to the ambient atmosphere has
		a surface area sinance than the surface area of the surface of the counter ejectrough under the first protonic conductive electrolyte membrane is exposed to
		said water vapor, who cold in the process conductive creditive inclination is exposed to substantially 100 percent relative humidity, a positive pressure of said water vapor exists from the
		surface of said counter electrode that is exposed to said water vapor to the surface of said sensing
		electrode that is exposed to the ambient atmosphere, the second protonic conductive electrolyte
	·	membrane is exposed to substantially 100 percent relative humidity, and a positive pressure of said
		water vapor exists from the surface of said second pump electrode that is exposed to said water vapor
		to the surface of said first pump electrode that is exposed to the ambient atmosphere."

ed Differences in Claim Language	laim	Unlike original patent claim 39, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of	a proton conductor material and 50-90 wt % of a first and a second electrical conductor material." Unlike original patent claim 39, presented reissue claim 67 does not recite the language "wherein the surface area of each of the surfaces of the second mum and counter electrodes that are exposed	to said water vapor by said means for exposing a surface of said second pump electrode to said water vapor are each separated from said means for exposing a surface of said second pump electrode to said water vapor by a hydrophobic membrane permeable to water vapor and	substantially impervious to water." Thatite original nation to loim 40 presented resigns of register the language "the sensing	electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode,"	and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 40, presented reissue claim 67 does not recite the language "wherein said means for exposing a surface of said second pump electrode to said water vapor further contains an antifreeze additive."
Presented	Reissue Claim	19				<i>L</i> 9		
Original	Patent Claim	39				40		

Original Reissue Claim Unlike original patent claim 41, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a first and a second electrical conductor material." Unlike original patent claim 41, presented reissue claim 67 does not recite the language "wherein at least one of the surfaces of said first protonic conductive electrolyte membrane in contact with one
Original tent Clai

Original Patent Claim	Presented Reissue Claim	Differences in Claim Language
43	29	Unlike original patent claim 43, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 43, presented reissue claim 67 does not recite the language "wherein the film is substantially composed of a noble metal."
44	67	Unlike original patent claim 44, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 44, presented reissue claim 67 does not recite the language "wherein the noble metal is platinum."

Differences in Claim Language		Unlike original patent claim 47, presented reissue claim 67 does not recite the language "wherein at least one of the first and second protonic conductive electrolyte membranes is a hydrated metal oxide protonic conductive electrolyte membrane."	Unlike original patent claim 48, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 48, presented reissue claim 67 does not recite the language "wherein the electrical conducting material of at least one of said sensing, counter, first pump, and second pump electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
Presented Reissue Claim	67		<i>L</i> 9	
Original Patent Claim	47		48	

Original Patent Claim	Presented Reissue Claim	Differences in Claim Language
49	29	Unlike original patent claim 49, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 49, presented reissue claim 67 does not recite the language "wherein the proton conductor material for said at least one of the sensing, counter, first pump, and second pump electrodes is a copolymer having a tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
50	29	Unlike original patent claim 50, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 50, presented reissue claim 67 does not recite the language wherein one of the first and second electrical conductor materials for said at least one of the sensing, counter, first pump, and second pump electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing, counter, first pump and second pump electrodes is about 1-50 wt % of platinum."

Original Patent Claim	Presented Reissue Claim	Differences in Claim Language
51	67	Unlike original patent claim 51, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 51, presented reissue claim 67 does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing, counter, first pump, and second pump electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing, counter, first pump, and second pump electrodes is about 1-50 wt % of Ru oxide."
52	29	Unlike original patent claim 52, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 52, presented reissue claim 67 does not recite the language "a reference electrode permeable to water vapor and comprised of an electrical conducting material; a counter electrode permeable to water vapor and comprised of an electrical conducting material and being separate from both said sensing and reference electrodes, and being exposed to the ambient atmosphere; a protonic conductive membrane permeable to water vapor, having top and bottom sides, said bottom side of said protonic conductive membrane being in contact with the counter electrode, and the top side of said protonic conductive membrane being in contact with the sensing and reference electrodes;" and also does not recite the language "wherein the electrical conducting material of at least one of said sensing, counter, and reference electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."

Differences in Claim Language	Unlike original patent claim 53, presented reissue claim 67 recites the language "the sensing electrode areacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 53, presented reissue claim 67 does not recite the language "further comprising: means for applying a DC power across said protonic electrolyte membrane in electrical contact between the sensing electrode and said counter electrode, whereby the gas is transported away from the counter electrode when the DC power means applies a DC power across said protonic electrolyte membrane."	Unlike original patent claim 54, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 54, presented reissue claim 67 does not recite the language "wherein said means for exposing a surface of said counter electrode to said water vapor further contains an antifreeze additive."
Presented Reissue Claim	29		29	
Original Patent Claim	53		54	

Differences in Claim Language	Unlike original patent claim 55, presented reissue claim 67 recites the language "the sensing electrode and reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 55, presented reissue claim 67 does not recite the language "wherein the surface of said sensing electrode that is exposed to the ambient atmosphere has a surface area smaller than the surface area of the surface of the counter electrode that is exposed to said water vapor, whereby the first protonic conductive electrolyte membrane is exposed to substantially 100 percent relative humidity, and a positive pressure of said water vapor exists from the surface of said counter electrode that is exposed to said water vapor to the surface of said sensing electrode that is exposed to the ambient atmosphere."	Unlike original patent claim 56, presented reissue claim 67 recites the language "the sensing electrode and reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 56, presented reissue claim 67 does not recite the language "wherein at least one of the surfaces of said protonic conductive electrolyte membrane in contact with one of the sensing, counter, and reference electrodes is substantially nonplanar."
Presented Reissue Claim	29		67	
Original Patent Claim	55		99	

Original Patent Claim	Presented Reissue Claim	Differences in Claim Language
57	29	Unlike original patent claim 57, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 57, presented reissue claim 67 does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing, counter, first pump, and second pump electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing, counter, first pump, and second pump electrodes is about 1-50 wt % of Ru oxide."
58	<i>L</i> 9	Unlike original patent claim 58, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 58, presented reissue claim 67 does not recite the language "wherein at least one of the sensing, counter, and reference electrodes is comprised of film having a thickness in the range of about 50 Angstroms to 10,000 Angstroms."

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Differences in Claim Language	Unlike original patent claim 59, presented reissue claim 67 recites the language "the sensing electrode are reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 59, presented reissue claim 67 does not recite the language "wherein the film is substantially composed of a noble metal."	Unlike original patent claim 60, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 60, presented reissue claim 67 does not recite the language "wherein the noble metal is platinum."
Presented Reissue Claim	<i>L</i> 9		67	
Original Patent Claim	29		09	

Original	Presented	Differences in Claim Language
ratent Claim	Keissue Ciailli	
61	19	Unlike original patent claim 61, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and
		the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter
		electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 61, presented reissue claim 67 does not recite the language "wherein the
		protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
!		Unlike original patent claim 62, presented reissue claim 67 recites the language "the sensing electrode
62	.09	reacting with the gas to produce a change in electrical characteristic between the sensing electrode and
		language "wherein the electrical conducting material of at least one of said sensing and counter
		electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor
		material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 62, presented reissue claim 67 does not recite the language "wherein the
		protonic conductive electrolyte membrane is a hydrated metal oxide protonic conductor electrolyte membrane."

Differences in Claim Language	Unlike original patent claim 63, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 63, presented reissue claim 67 does not recite the language "wherein the proton conductor material for said at least one of the sensing, counter, and reference electrodes is a copolymer having a tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 64, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 64, presented reissue claim 67 does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing, counter, and reference electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing, counter, and reference electrodes is about 1-50 wt % of platinum."
Presented Reissue Claim	29		<i>L</i> 9	
Original Patent Claim	63		64	

Differences in Claim Language	Unlike original patent claim 65, presented reissue claim 67 recites the language "the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 65, presented reissue claim 67 does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing, counter, and reference electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing, counter, and reference electrodes is about 1-50 wt % of Ru oxide."
Original Presented Patent Claim Reissue Claim	29	·
Original Patent Claim	65	

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
	89	Unlike original patent claim 1, presented reissue claim 68 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode
		and the counter electrode being the only two electrodes in contact with the first protonic
		conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce
		a change in electrical characteristic between the sensing electrode and the counter electrode
		in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 2, presented reissue claim 68 recites the language "a two-
2	89	electrode electrochemical gas sensor" and also recites the language "the sensing electrode
		and the counter electrode being the only two electrodes in contact with the first protonic
		conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce
		a change in electrical characteristic between the sensing electrode and the counter electrode
		in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 2, presented reissue claim 68 does not recite the language
		"wherein said water vapor containing means contains a volume of water and an antifreeze
		additive."

Original	Presented	Differences in Claim Language
3	68	Unlike original patent claim 3, presented reissue claim 68 recites the language "a two- electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode
		in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 3, presented reissue claim 68 does not recite the language "wherein the surface of said sensing electrode that is exposed to the ambient atmosphere has
		a surface area that is smaller than the surface area of the surface of the counter electrode that is exposed to said water vapor, whereby the first protonic conductive electrolyte membrane is exposed to substantially 100 percent relative humidity, and a positive pressure of said
		water vapor exists from the surface of said counter electrode exposed to said water vapor to the surface of said sensing electrode exposed to the ambient atmosphere."
4	89	Unlike original patent claim 4, presented reissue claim 68 recites the language "a two- electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic
		conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 4, presented reissue claim 68 does not recite the language "wherein the surface area of the surface of the counter electrode that is exposed to said water
		vapor is separated from said means for exposing a surface of said counter electrode to said water vapor by a hydrophobic membrane permeable to water vapor and substantially impervious to water."

Original	Presented	Differences in Claim Language
Patent Claim	Keissue Claim	
		Unlike original patent claim 5, presented reissue claim 68 recites the language "a two-
5	89	electrode electrochemical gas sensor" and also recites the language "the sensing electrode
		and the counter electrode being the only two electrodes in contact with the first protonic
		conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce
		a change in electrical characteristic between the sensing electrode and the counter electrode
		in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 5, presented reissue claim 68 does not recite the language
		"wherein the first protonic conductive electrolyte membrane has opposing surfaces, each of
		said opposing surfaces being in contact with one of the sensing and counter electrodes,
		wherein at least one of the opposing surfaces of said first protonic conductive electrolyte
		membrane in contact with one of the sensing and counter electrodes is substantially
		nonplanar."
		Unlike original natent claim 6 presented reissue claim 68 recites the language "a two-
,	(
9	89	electrode electrochemical gas sensor" and also recites the language "the sensing electrode
		and the counter electrode being the only two electrodes in contact with the first protonic
		conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce
		a change in electrical characteristic between the sensing electrode and the counter electrode
		in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 6, presented reissue claim 68 does not recite the language
		"wherein at least one of the sensing and counter electrodes is comprised of film having a
		thickness in the range of about 50 Angstroms to 10,000 Angstroms."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
7	89	Unlike original patent claim 7, presented reissue claim 68 recites the language "a two-electrode electrochemical oas sensor" and also recites the language "the sensing electrode
•	}	and the counter electrode being the only two electrodes in contact with the first protonic
		conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce
		a change in electrical characteristic between the sensing electrode and the counter electrode
		in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 7, presented reissue claim 68 does not recite the language
		"wherein the film is substantially composed of a noble metal."
		Unlike original patent claim 8, presented reissue claim 68 recites the language "a two-
∞	89	electrode electrochemical gas sensor" and also recites the language "the sensing electrode
		and the counter electrode being the only two electrodes in contact with the first protonic
		conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce
		a change in electrical characteristic between the sensing electrode and the counter electrode
		in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 8, presented reissue claim 68 does not recite the language
		Wherein the noble metal is platinum.

Original	Presented	Differences in Claim Language
ratent Claim	Keissue Claim	
	Ç	Unlike original patent claim 9, presented reissue claim 68 recites the language "a two-
ر	89	electrode electrochemical gas sensor" and also recites the language "the sensing electrode
		and the counter electrode being the only two electrodes in contact with the first protonic
		conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce
		a change in electrical characteristic between the sensing electrode and the counter electrode
		in the absence of an applied voltage to the sensing electrode."
		Inlike original natent claim 0 presented reissue claim 68 does not regite the language
		"wherein the first protonic conductive electrolyte membrane is substantially composed of a
		wherein the first protein comments electronic inclinitations is substantially composed of a solid, perfluorinated, ion-exchange polymer."
		Unlike original patent claim 10, presented reissue claim 68 recites the language "a two-
10	89	electrode electrochemical gas sensor" and also recites the language "the sensing electrode
		and the counter electrode being the only two electrodes in contact with the first protonic
		conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce
		a change in electrical characteristic between the sensing electrode and the counter electrode
		in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 10, presented reissue claim 68 does not recite the language
		"wherein the first protonic conductive electrolyte membrane is a hydrated metal oxide
		protonic conductor electrolyte memorane.
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Original Patent Claim	Presented Reissue Claim	Differences in Claim Language
11	89	Unlike original patent claim 11, presented reissue claim 68 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 11, presented reissue claim 68 does not recite the language "wherein the proton conductor material for said at least one of the sensing and counter electrodes is a copolymer having a tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
12	89	Unlike original patent claim 12, presented reissue claim 68 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 12, presented reissue claim 68 does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing and counter electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing and counter electrodes is about 1-50 wt % of platinum."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
13	89	Unlike original patent claim 13, presented reissue claim 68 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter
		electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical
		characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 13, presented reissue claim 68 does not recite the language "wherein one of
		the first and second electrical conductor materials for said at least one of the sensing and counter
		electrodes is about 30-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing and counter electrodes is about 1-50 wt % of Ru oxide."
1.4	89	Unlike original patent claim 14, presented reissue claim 68 recites the language "a two-electrode
•	3	electrode being the only two electrodes in contact with the first protonic conductive electrolyte
		membrane, and the sensing electrode reacting with the gas to produce a change in electrical
		characteristic between the sensing electrode and the counter electrode in the absence of an applied
		Voltago to the solishing electrode.
		Unlike original patent claim 14, presented reissue claim 68 does not recite the language "wherein the
		electrochemical gas sensor further comprises: first and second pump electrodes comprised of an
		electrical conducting material permeable to water vapor, separate from said sensing and counter electrodes and situated on connecte sides of and in contact with said first protonic conductive
		electrolyte membrane, said second pump electrode being situated on the same side of said first protonic
		conductive membrane as the counter electrode and having a surface thereon exposed to the water vapor
		in said means for exposing a surface of said counter electrode to said water vapor, and means for
		applying a DC power across the first protonic conductive electrolyte membrane, said first and second
		pump electrodes having in electrical connection therebetween said means for applying LPC power across
		the first protonic conductive electrolyte members, whereby the gas is transported away from the counter electrode when the DC nower means applies a DC nower to the first and second number
		electrodes."

Differences in Claim Language	Unlike original patent claim 15, presented reissue claim 68 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 15, presented reissue claim 68 does not recite the language "wherein the electrical conducting material of the first and second pump electrodes is substantially composed of carbon."	Unlike original patent claim 16, presented reissue claim 68 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 16, presented reissue claim 68 does not recite the language "wherein the electrical conducting material of the first and second pump electrodes is substantially composed of noble metals."
Presented Reissue Claim	89		89	
Original Patent Claim	15		16	

nted Differences in Claim Language Claim	Unlike original patent claim 17, presented reissue claim 68 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 17, presented reissue claim 68 does not recite the language "wherein the electrical conducting material of the first and second pump electrodes is substantially composed of conductive hydrated metal oxides."	Unlike original patent claim 18, presented reissue claim 68 recites the language "a two- electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 18, presented reissue claim 68 does not recite the language "wherein at least one of the first and second pump electrodes is comprised of a film having a thickness in the range of about 50 Angstroms to 10,000 Angstroms."
Presented Reissue Claim	89	89
Original Patent Claim	17	18

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
19	89	Unlike original patent claim 19, presented reissue claim 68 recites the language "a two- electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic
		conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the change of or smalled voltage to the counter electrode.
		III LIIC abscrice of all applied voltage to the scholing electrone.
		Unlike original patent claim 19, presented reissue claim 68 does not recite the language "wherein the electrical conducting material of said first and second pump electrodes is a
		proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 20, presented reissue claim 68 recites the language "a two-
20	89	electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic
		conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce
		in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 20, presented reissue claim 68 does not recite the language "wherein the proton conductor material for both the first and second pump electrodes is a
		copolymer having a tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
21	89	Unlike original patent claim 21, presented reissue claim 68 recites the language "a two- electrode electrochemical gas sensor" and also recites the language "the sensing electrode
		and the counter electrode being the only two electrodes in contact with the first protonic
		conductive electrolyte memorane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode
		in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 21, presented reissue claim 68 does not recite the language
		"wherein one of the first and second electrical conductor materials for the first pump
		electrode is about 50-99 wt % of carbon black, and the other of the first and second electrical
		conductor materials for the first pump electrode is 1 to 50 Wt % of platinum."
7.7	07	Unlike original patent claim 22, presented reissue claim 68 recites the language "a two-
7	3	and the counter electrode being the only two electrodes in contact with the first protonic
		conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce
		a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 22, presented reissue claim 68 does not recite the language
		"wherein one of the first and second electrical conductor materials for the second pump electrode is about 50-99 wt % of carbon black, and the other of the first and second electrical
		conductor materials for the second pump electrode is 1 to 50 wt % of Ru oxide."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
23	89	Unlike original patent claim 23, presented reissue claim 68 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 23, presented reissue claim 68 does not recite the language "wherein the electrochemical gas sensor further comprises: a second protonic conductive electrolyte membrane permeable to water vapor; first and second pump electrodes permeable to water vapor and comprised of an electron conductive material, and being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane, said means for exposing a surface of said second pump electrode to said water vapor and said first pump electrode having a surface exposed to the ambient atmosphere; and means for applying a DC power across said second protonic electrolyte membrane, said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across said second protonic electrolyte gas is transported away from the counter electrode when the DC power means applies a DC power to the first and second pump electrodes."
24	89	Unlike original patent claim 24, presented reissue claim 68 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 24, presented reissue claim 68 does not recite the language "wherein the second protonic conductive electrolyte membrane is substantially composed of a solid, perfluorinated, ion-exchange polymer."

Differences in Claim Language	Unlike original patent claim 25, presented reissue claim 68 recites the language "a two-electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode." Unlike original patent claim 25, presented reissue claim 68 does not recite the language "two produces or the produce or the language "two produces "two produces or the language "two pr	protonic conductor electrolyte membrane." Unlike original patent claim 26, presented reissue claim 68 recites the language "a two-electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrode reacting with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 26, presented reissue claim 68 does not recite the language "wherein the surface area of the surface of said first pump electrode that is exposed to the surface area of the surface of the second pump electrode that is exposed to said water vapor, whereby the second protonic conductive electrolyte membrane is exposed to substantially 100 percent relative humidity, and a positive pressure of said water vapor exists from the surface of said second pump electrode that is exposed to said water vapor to the surface of said first pump electrode that is exposed to the ambient atmosphere."
Presented Reissue Claim		89	
Original Patent Claim	25	26	

Original Botont Cloim	Presented Discord	Differences in Claim Language
27	89	Unlike original patent claim 27, presented reissue claim 68 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 27, presented reissue claim 68 does not recite the language "wherein the surface area of the surface of the second pump electrode that is exposed to said water vapor is separated from said means for exposing a surface of said counter electrode to said water vapor by a hydrophobic membrane permeable to water vapor and substantially impervious to water."
28	89	Unlike original patent claim 28, presented reissue claim 68 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 28, presented reissue claim 68 does not recite the language "further comprising: means for applying a DC pulse power source across the first protonic conductive membrane, said sensing and counter electrodes having in electrical connection therebetween said means for alternating DC pulse power across the first protonic conductive membrane; and switch means for alternating the connection between the sensing and counter electrodes from the electrical measurement means to the DC pulse power means; whereby, in a positive ambient atmosphere concentration of said gas, said electrical measurement means detects changes in said electrical characteristic when said switch means connects said DC pulse power means moves the gas away from a side of the gas sensor where the counter electrode is placed when said switch means connects said DC pulse power means to the sensing and counter electrodes."

nted Differences in Claim Language	Claim	Unlike original patent claim 29, presented reissue claim 68 recites the language "a two-electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an amiliad voltage to the sensing electrode ."	Unlike original patent claim 29, presented reissue claim 68 does not recite the language "wherein the gas is CO."	Unlike original patent claim 30, presented reissue claim 68 recites the language "a two- electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 30, presented reissue claim 68 does not recite the language "wherein the gas is NO _x ."
Presented	Reissue Claim	89		89	
Original	Patent Claim	29		30	

Presented Differences in Claim Language	Reissue Claim	Unlike original patent claim 31, presented reissue claim 68 recites the language "a two- electrode electrochemical gas sensor" and also recites the language "the sensing electrode	<u>a</u>	conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce	in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 31, presented reissue claim 68 does not recite the language	"wherein the gas is hydrogen."	68 electrode electrochemical gas sensor, and also recites the language, the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic	conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce	a change in electrical characteristic between the sensing electrode and the counter electrode	in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 32, presented reissue claim 68 does not recite the language	6-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1
Presented	Reissue Clair	89						89					
Original	Patent Claim	31		-				32					

Original Presented	U 68		Unlike original patent claim 33 "wherein the gas is H ₂ O vapor."	Unlike original patent clair electrode electrochemical gand the counter electrode b	conductive electrolyte mer a change in electrical chara in the absence of an applie	Unlike original patent claim 34, pre "wherein the gas is alcohol vapor."
Differences in Claim Language	Unlike original patent claim 33, presented reissue claim 68 recites the language "a two- electrode electrochemical gas sensor" and also recites the language "the sensing electrode	and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 33, presented reissue claim 68 does not recite the language "wherein the gas is H ₂ O vapor."	Unlike original patent claim 34, presented reissue claim 68 recites the language "a two- electrode electrochemical gas sensor" and also recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic	conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 34, presented reissue claim 68 does not recite the language "wherein the gas is alcohol vapor."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
35	89	Unlike original patent claim 35, presented reissue claim 68 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 35, presented reissue claim 68 does not recite the language "a second protonic conductive electrolyte membrane permeable to water vapor;" does not recite the language "and said first pump electrode having a surface exposed to the ambient atmosphere, said second pump electrode being separated from said counter electrode by said means for exposing a surface of said second pump electrode to said water vapor, and said counter electrode to said water vapor," and also does not recite the language "means for applying a DC power across said second protonic electrolyte membrane in electrical contact with said first and second pump electrodes; whereby the gas is transported away from the counter electrode when the DC power means applies a DC power across said second protonic electrolyte membrane."
36	89	Unlike original patent claim 36, presented reissue claim 68 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material." Unlike original patent claim 36, presented reissue claim 68 does not recite the language "wherein at least one of said first and second protonic conductive electrolyte membranes is substantially comprised of a solid, perfluorinated, ion-exchange polymer."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
37	89	Unlike original patent claim 37, presented reissue claim 68 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in
		contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an amplied voltage to the sensing electrode, and also regites the language "wherein the electrical conducting
		material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having
		10-50 Wt % of a proton conductor material and 50-90 Wt % of a first and a second electrical conductor material.
		Unlike original patent claim 37, presented reissue claim 68 does not recite the language "wherein at least one of the
		first and second protonic conductive electrolyte membranes is a hydrated metal oxide protonic conductor electrolyte membrane."
Ç	G,	Unlike original patent claim 38, presented reissue claim 68 recites the language "a two-electrode electrochemical
28	8 0	gas sensor, recites the tanguage the sensing electrode and the counter electrode being the only two electrodes in
		produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence
		of an applied voltage to the sensing electrode" and also recites the language "wherein the electrical conducting
		material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 38, presented reissue claim 68 does not recite the language "wherein the surface of said first num electrode that is exposed to the ambient atmosphere has a surface area smaller than the surface area of
		the surface of the second pump electrode that is exposed to said water vapor, and wherein the surface of said
		surface of the counter electrode that is exposed to said water vapor, whereby the first protonic conductive
		vapor exists from the surface of said counter electrode that is exposed to said water vapor to the surface of said
		sensing electrode that is exposed to the ambient atmosphere, the second protonic conductive electrolyte membrane
		is exposed to substantially 100 percent relative humidity, and a positive pressure of said water vapor exists from the
		surface of said second pump electrode that is exposed to said water vapor to the surface of said first pump electrode
		that is exposed to the ambient atmosphere."

Differences in Claim Language	:	Unlike original patent claim 39, presented reissue claim 68 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 39, presented reissue claim 68 does not recite the language "wherein the surface area of each of the surfaces of the second pump and counter electrodes that are exposed to said water vapor by said means for exposing a surface of said second pump electrode to said water vapor are each separated from said means for exposing a surface of said second pump electrode to said water vapor by a hydrophobic membrane permeable to water vapor and substantially impervious to water."	Unlike original patent claim 40, presented reissue claim 68 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material." Unlike original patent claim 40, presented reissue claim 68 does not recite the language "wherein said means for exposing a surface of said second pump electrode to said water vapor further contains an antifreeze additive."
Presented	Reissue Claim	89		89
Original	Patent Claim	39		40

ted Differences in Claim Language	Unlike original patent claim 41, presented reissue claim 68 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 41, presented reissue claim 68 does not recite the language "wherein at least one of the surfaces of said first protonic conductive electrolyte membrane in contact with one of the sensing and counter electrodes is substantially nonplanar, and wherein at least one of the surfaces of said second protonic conductive electrolyte membrane in contact with one of the first and second pump electrodes is substantially nonplanar."	Unlike original patent claim 42, presented reissue claim 68 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material." Unlike original patent claim 42, presented reissue claim 68 does not recite the language "wherein at least one of the sensing, counter, first pump, and second pump electrodes is comprised of film having a thickness in the range of about 50 Angstroms to 10,000 Angstroms."
Presented Reissue Claim	89		89
Original Patent Claim	41		42

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
43	89	Unlike original patent claim 43, presented reissue claim 68 recites the language "a two-electrode lettrochemical oas sensor" recites the language "the sensing electrode and the counter electrode
2	}	being the only two electrodes in contact with the first protonic conductive electrolyte membrane,
		and the sensing electrode reacting with the gas to produce a change in electrical characteristic
		between the sensing electrode and the counter electrode in the absence of an applied voltage to the
		least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical
		conductor material."
		Unlike original patent claim 43, presented reissue claim 68 does not recite the language "wherein
		the film is substantially composed of a noble metal."
		Unlike original patent claim 44, presented reissue claim 68 recites the language "a two-electrode
44	89	electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode
		being the only two electrodes in contact with the first protonic conductive electrolyte membrane,
		and the sensing electrode reacting with the gas to produce a change in electrical characteristic
*******		between the sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode" and also recites the language "wherein the electrical conducting material of at
		least one of said sensing and counter electrodes is a proton-electron mixed conductive material
-		having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical
		conductor material."
		Unlike original patent claim 44, presented reissue claim 68 does not recite the language "wherein

Original Patent Claim 45	Presented Reissue Claim 68	Differences in Claim Language Unlike original patent claim 45, presented reissue claim 68 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electroly membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode, and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material." Unlike original patent claim 45, presented reissue claim 68 does not recite the language "wherein the at least one of the sensing, counter, first pump, and second pump electrodes is substantially comprised of proton conductive material." Unlike original patent claim 46, presented reissue claim 68 recites the language "two-electrode electrodemical gas sensor," recites the language "the sensing electrode reacting with the first protonic conductive electroly harden electrodemical electrodes and also recites the language "wherein the absence of an applied voltage to the sensing electrode, and also recites the language "wherein the electrical conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
49	89	Unlike original patent claim 49, presented reissue claim 68 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode
		being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic
		between the sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material
		having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical
		conductor material."
		Unlike original patent claim 49, presented reissue claim 68 does not recite the language "wherein
		the proton conductor material for said at least one of the sensing, counter, first pump, and second
		pump electrodes is a copolymer having a tetrafluoroethylene backbone with a side chain of
		perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid oronn."
		Unlike original patent claim 50, presented reissue claim 68 recites the language "a two-electrode
50	89	electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode
		being the only two electrodes in contact with the first protonic conductive electrolyte membrane,
		and the sensing electrode reacting with the gas to produce a change in electrical characteristic
		between the sensing electrode and the counter electrode in the absence of an applied voltage to the
		least one of said sensing and counter electrodes is a proton-electron mixed conductive material
		having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical
		conductor material."
		Unlike original patent claim 50, presented reissue claim 68 does not recite the language wherein one
		of the first and second electrical conductor materials for said at least one of the sensing, counter,
		_
		first and second electrical conductor materials for said at least one of the sensing, counter, first
		pump and second pump electrodes is about 1-30 Wt % of piatinum.

Original Patent Claim	Presented Reissue Claim	Differences in Claim Language Unlike original patent claim 51, presented reissue claim 68 recites the language "a two-electrode electrochemical
51	89	gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 51, presented reissue claim 68 does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing, counter, first pump, and second pump electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing, counter, first pump, and second pump electrodes is about 1-50 wt % of Ru oxide."
52	89	Unlike original patent claim 52, presented reissue claim 68 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 52, presented reissue claim 68 does not recite the language "a reference electrode permeable to water vapor and comprised of an electrical conducting material; a counter electrode permeable to water vapor and comprised of an electrical conducting material and being separate from both said sensing and reference electrodes, and being exposed to the ambient atmosphere; a protonic conductive electrolyte membrane permeable to water vapor, having top and bottom sides, said bottom side of said protonic conductive membrane being in contact with the counter electrode, and the top side of said protonic conductive membrane being in contact with the sensing and reference electrodes;" and also does not recite the language "wherein the electrical conducting material of at least one of said sensing, counter, and reference electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."

Differences in Claim Language	n	Unlike original patent claim 53, presented reissue claim 68 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the	sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "wherein the electrical conducting material of at least one of	said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 53, presented reissue claim 68 does not recite the language "further comprising: means for applying a DC power across said protonic electrolyte membrane in electrical contact between the sensing electrode and said counter electrode, whereby the gas is transported away	electrolyte membrane."	Unlike original patent claim 54, presented reissue claim 68 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the	sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing	electrode" and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt %	of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 54, presented reissue claim 68 does not recite the language "wherein said means for exposing a surface of said counter electrode to said water vapor further contains an antifreeze	additive."
Presented	Reissue Claim	89					89					
Original	Patent Claim	53					54					

Presented Differences in Claim Language	m	Unlike original patent claim 57, presented reissue claim 68 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt %	Unlike original patent claim 57, presented reissue claim 68 does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing, counter, first pump, and second pump electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing, counter, first pump, and second pump electrodes is about 1-50 wt % of Ru oxide."	Unlike original patent claim 58, presented reissue claim 68 recites the language "a two-electrode electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode, and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a first and a second electrical conductor material."	Unlike original patent claim 58, presented reissue claim 68 does not recite the language "wherein at least one of the sensing, counter, and reference electrodes is comprised of film having a thickness in the
Orioinal	===	57		28	

Differences in Claim Language	Unlike original patent claim 59, presented reissue claim 68 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "wherein the electrical conductive material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	film is substantially composed of a noble metal." Unlike original patent claim 60, presented reissue claim 68 recites the language "a two-electrode being electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode, and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a first and a second electrical conductor material." Unlike original patent claim 60, presented reissue claim 68 does not recite the language "wherein the noble metal is platinum."
Presented Reissue Claim	89	89
Original Patent Claim	59	09

Presented Differences in Claim Language	Reissue Claim	Unlike original patent claim 61, presented reissue claim 68 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a first and a second electrical conductor material."	Unlike original patent claim 61, presented reissue claim 68 does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."	Unlike original patent claim 62, presented reissue claim 68 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode" and also recites the language "wherein the electrical conductive material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a first and a second electrical conductor material." Unlike original patent claim 62, presented reissue claim 68 does not recite the language "wherein the protonic conductive electrolyte membrane is a hydrated metal oxide protonic conductor electrolyte
Original	Patent Claim	61		62

nted Differences in Claim Language Claim	Unlike original patent claim 63, presented reissue claim 68 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a first and a second electrical conductor material."	Unlike original patent claim 63, presented reissue claim 68 does not recite the language "wherein the proton conductor material for said at least one of the sensing, counter, and reference electrodes is a copolymer having a tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 64, presented reissue claim 68 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode, and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a first and a second electrical conductor material." Unlike original patent claim 64, presented reissue claim 68 does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing, counter, and reference electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing, counter, and reference electrodes is about 1-50 wt % of all simms."
Presented Reissue Claim	89		89
Original Patent Claim	63		64

Original	Presented	Differences in Claim Language
Patent Claim	~	
99	. 89	Unlike original patent claim 65, presented reissue claim 68 recites the language "a two-electrode electrochemical gas sensor," recites the language "the sensing electrode and the counter electrode being the only two electrodes in contact with the first protonic conductive electrolyte membrane, and the sensing electrode reacting with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of
		said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 65, presented reissue claim 68 does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing, counter, and reference electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing, counter, and reference electrodes is about 1-50 wt % of Ru oxide."

Differences in Claim Language		Unlike original patent claim 1, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" and also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claims 1, presented reissue claim 69 does not recite the language "quantitative measurement."	Unlike original patent claim 2, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" and also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 2, presented reissue claim 69 does not recite the language "quantitative measurement," or the language "wherein said water vapor containing means contains a volume of water and an antifreeze additive."
Presented	Patent Claim Reissue Claim	69		69	
Original	Patent Claim	П		2	

Original Patent Claim	Presented Reissue Claim	Differences in Claim Language
8	. 69	Unlike original patent claim 3, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" and also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."
		Unlike original patent claim 3, presented reissue claim 69 does not recite the language "quantitative measurement," and does not recite the language "wherein the surface of said sensing electrode that is exposed to the ambient atmosphere has a surface area that is smaller than the surface area of the surface of the counter electrode that is exposed to said water
		vapor, whereby the first protonic conductive electrolyte membrane is exposed to substantially 100 percent relative humidity, and a positive pressure of said water vapor exists from the surface of said counter electrode exposed to said water vapor to the surface of said sensing electrode exposed to the ambient atmosphere."
4	69	Unlike original patent claim 4, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" and also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."
		Unlike original patent claim 4, presented reissue claim 69 does not recite the language "quantitative measurement," and does not recite the language "wherein the surface area of the surface of the counter electrode that is exposed to said water vapor is separated from said means for exposing a surface of said counter electrode to said water vapor by a hydrophobic membrane permeable to water vapor and substantially impervious to water."

Differences in Claim Language	Unlike original patent claim 5, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" and also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 5, presented reissue claim 69 does not recite the language "quantitative measurement," and does not recite the language "wherein the first protonic conductive electrolyte membrane has opposing surfaces, each of said opposing surfaces being in contact with one of the sensing and counter electrolyte membrane in contact with one of the sensing and counter electrodes is substantially nonplanar."	Unlike original patent claim 6, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" and also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 6, presented reissue claim 69 does not recite the language "quantitative measurement," and does not recite the language "wherein at least one of the sensing and counter electrodes is comprised of film having a thickness in the range of about 50 Angstroms to 10,000 Angstroms."
Presented Reissue Claim	69		69	
Original Patent Claim	5		9	

Differences in Claim Language	Unlike original patent claim 7, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" and also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 7, presented reissue claim 69 does not recite the language "quantitative measurement," and does not recite the language "wherein the film is substantially composed of a noble metal."	Unlike original patent claim 8, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" and also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 8, presented reissue claim 69 does not recite the language "quantitative measurement," and does not recite the language "wherein the noble metal is platinum."
Presented Reissue Claim	69		69	
Original Patent Claim	7		∞	

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
		Unlike original patent claim 9, presented reissue claim 69 recites the language "an
6	69	electrochemical gas sensor for sensing a gas in an ambient atmosphere" and also recites the
		language "the sensing electrode and the counter electrode being on opposite sides of the first
		protonic conductive electrolyte memorane.
		Unlike original patent claim 9, presented reissue claim 69 does not recite the language
		"quantitative measurement," and does not recite the language "wherein the first protonic
		conductive electrolyte membrane is substantially composed of a solid, perfluorinated, ion-
		exchange polymer."
		Unlike original patent claim 10, presented reissue claim 69 recites the language "an
10	69	electrochemical gas sensor for sensing a gas in an ambient atmosphere" and also recites the
		language "the sensing electrode and the counter electrode being on opposite sides of the first
		protonic conductive electrolyte membrane."
•		Unlike original patent claim 10, presented reissue claim 69 does not recite the language
		"quantitative measurement," and does not recite the language "wherein the first protonic
		conductive electrolyte membrane is a hydrated metal oxide protonic conductor electrolyte
		membrane."

Unlike original patent claim 12, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" and also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane." Unlike original patent claim 12, presented reissue claim 69 does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing and counter electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing and counter electrodes is
Unlike original patent claim 11, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" and also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane." Unlike original patent claim 11, presented reissue claim 69 does not recite the language "wherein the proton conductor material for said at least one of the sensing and counter electrodes is a copolymer having a tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
13	69	Unlike original patent claim 13, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" and also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."
		Unlike original patent claim 13, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing and counter electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing and counter electrodes is about 1-50 wt % of Ru oxide."
14	69	Unlike original patent claim 14, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" and also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."
		Unlike original patent claim 14, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor further comprises: first and second pump electrodes comprised of an electrical conducting material permeable to water vapor, separate from said sensing and counter electrodes, and situated on opposite sides of and in contact with said first protonic conductive electrolyte membrane as the counter electrode being situated on the same side of said first protonic conductive membrane as the counter electrode to said water vapor; and means for applying a DC power across the first protonic conductive electrolyte membrane, said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across the first protonic conductive electrolyte membrane; whereby the gas is transported away from the counter electrode when the DC power means applies a DC power to the first and second pump electrodes."

				
Differences in Claim Language	Unlike original patent claim 15, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" and also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 15, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrical conducting material of the first and second pump electrodes is substantially composed of carbon."	Unlike original patent claim 16, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" and also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 16, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrical conducting material of the first and second pump electrodes is substantially composed of noble metals."
Presented Reissue Claim	69		69	
Original Patent Claim	15		16	

Presented Reissue Claim Unlike original patent claim 17, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" and also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane." Unlike original patent claim 17, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrical conductive hydrated metal oxides." Unlike original patent claim 18, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" and also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane." Unlike original patent claim 18, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein at least one of the first and second pump electrodes is comprised of a film having a thickness in the range of about 50 Angstroms to 10,000 Angstroms."
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Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
19	69	Unlike original patent claim 19, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" and also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."
		Unlike original patent claim 19, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrical conducting material of said first and second pump electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
20	69	Unlike original patent claim 20, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" and also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."
		Unlike original patent claim 20, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the first and second pump electrodes is a copolymer having a tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."

ed Differences in Claim Language	Unlike original patent claim 21, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" and also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 21, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the first pump electrode is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for the first pump electrode is 1 to 50 wt % of platinum."	Unlike original patent claim 22, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" and also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 22, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the second pump electrode is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for the second pump electrode is 1 to 50 wt % of Ru oxide."
Presented	Keissue Claim 69		69	
Original	Patent Claim 21		22	

Differences in Claim Language	Unlike original patent claim 23, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" and also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 23, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor further comprises: a second protonic conductive electrolyte membrane permeable to water vapor; first and second pump electrodes permeable to water vapor and comprised of an electron conductive material, and being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane, said means for said water vapor exposing a surface of said second pump electrode to said water vapor, and said first pump electrode having a surface exposed to the ambient atmosphere; and means for applying a DC power across said second protonic electrolyte membrane, said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across said second protonic electrolyte membrane; whereby the gas is transported away from the counter electrode when the DC power means applies a DC power to the first and second pump electrodes."	Unlike original patent claim 24, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" and also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane." Unlike original patent claim 24, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein the second protonic conductive electrolyte membrane is substantially composed of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	69		69
Original Patent Claim	23		24

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
25	69	Unlike original patent claim 25 presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" and also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."
		Unlike original patent claim 25, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein the second protonic conductive electrolyte membrane is a hydrated metal oxide protonic conductor electrolyte membrane."
26	69	Unlike original patent claim 26, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" and also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."
		Unlike original patent claim 26, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein the surface area of the surface of said first pump electrode that is exposed to the ambient atmosphere is smaller than the surface area of the surface of the second pump electrode that is exposed to said water vapor, whereby the second protonic conductive electrolyte membrane is exposed to substantially 100 percent relative humidity, and a positive pressure of said water vapor exists from the surface of said second pump electrode that is exposed to said water vapor to the surface of said first pump electrode that is exposed to the ambient atmosphere."

Differences in Claim Language		Unlike original patent claim 29, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" and also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 29, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein the gas is CO."	Unlike original patent claim 30, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" and also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 30, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein the gas is NO _x ."
Presented	Reissue Claim	69		69	
Original	Patent Claim	29		30	

Differences in Claim Language	Unlike original patent claim 31, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" and also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 31, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein the gas is hydrogen."	Unlike original patent claim 32, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" and also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 32, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein the gas is H ₂ S."
Presented Reissue Claim	69		69	
Original Patent Claim	31		32	

Differences in Claim Language	Unlike original patent claim 33, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" and also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 33, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein the gas is H ₂ O vapor."	Unlike original patent claim 34, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" and also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane."	Unlike original patent claim 34, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein the gas is alcohol vapor."
Presented Reissue Claim	69		69	
Original Patent Claim	33	· _ -	34	

(ci.s.)	Presented Differences in Claim Language Reissue Claim	Unlike original patent claim 35, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 35, presented reissue claim 69 does not recite the language "quantitative measurement," does not recite the language "a second protonic conductive electrolyte membrane permeable to water vapor;" does not recite the language "and said first pump electrode having a surface exposed to the ambient atmosphere, said second pump electrode being separated from said counter electrode by said means for exposing a surface of said second pump electrode to said water vapor, and said counter electrode having a surface exposed to said water vapor by said means for exposing a surface of said second pump electrode to said water vapor," and also does not recite the language "means for applying a DC power across said second protonic electrolyte membrane in electrical contact with said first and second pump electrodes; whereby the gas is transported away from the counter electrode when the DC power means applies a DC power across said second protonic electrolyte membrane."	Unlike original patent claim 36, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 36, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein at least one of said first and second protonic conductive electrolists membranes is substantially commised of a solid perfunctionated ion-exchange
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nted Differences in Claim Language Claim	Unlike original patent claim 35, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 35, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein at least one of the first and second protonic conductive electrolyte membranes is a hydrated metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 38, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 38, presented reissue claim 69 does not recite the language "wherein the surface of said first pump electrode that is exposed to the ambient atmosphere has a surface area smaller than the surface area of the surface of the second pump electrode that is exposed to said water vapor, and wherein the surface area of the surface of the counter electrode that is exposed to said water vapor, whereby the first protonic conductive electrolyte membrane is exposed to substantially 100 percent relative humidity, a positive pressure of said water vapor exists from the surface of said counter electrode that is exposed to said water vapor to the surface of said sensing electrode that is exposed to the ambient atmosphere, the second protonic conductive electrolyte membrane is exposed to substantially 100 percent relative humidity, and a positive pressure of said water vapor exists from the surface of said second pump electrode that is exposed to said water vapor to the surface of said first pump electrode that is exposed to said water vapor to the surface of said first pump electrode that is exposed to said water vapor to the surface of said first pump electrode that is exposed to said water vapor to the surface of said first pump electrode that is exposed to said water vapor to the surface of said first pump electrode that is exposed to said water vapor to the surface of said first pump electrode that is exposed to said water vapor to the surface of said first pump electrode that is exposed to said water vapor to the surface of said first pump electrode that is exposed to said water vapor to the surface of said first pump electrode that is exposed to said water vapor to the surface of said first pump electrode that is exposed to said water vapor to the surface of said first pump electrode that is exposed to said water vapor exists from the surface of said water vapor exists from the surface of said water vapor exists from the surface of said water vapor exists exposed to said water vapor exists ex
Presented Reissue Claim	69		69	
Original Patent Claim	37		38	

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
		Unlike original patent claim 39, presented reissue claim 69 recites the language "an electrochemical
39	69	gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte
		membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material baying 10-50
		wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 39, presented reissue claim 69 does not recite the language
		"quantitative measurement," and also does not recite the language "wherein the surface area of each
		of the surfaces of the second pump and counter electrodes that are exposed to said water vapor by
		said means for exposing a surface of said second pump electrode to said water vapor are each
		separated from said means for exposing a surface of said second pump electrode to said water vapor
		by a hydrophobic infemorate penifeable to water vapor and substantianly impervious to water.
6	9	Unlike original patent claim 40, presented reissue claim 69 recites the language "an electrochemical
5	60	gas scrisol for scrising a gas in an anionomic active for the fair anguage the scrising electrone
		and the counter electrode being on opposite sides of the first protonic conductive electrolyte
		membrane," and also recites the language "wherein the electrical conducting material of at least one
		of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50
		wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor
		material."
		Unlike original patent claim 40, presented reissue claim 69 does not recite the language
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		a surface of said second pump electrode to said water vapor further contains an antifreeze additive."

Differences in Claim Language	Unlike original patent claim 43, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."  Unlike original patent claim 43, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein the film is substantially composed of a noble metal."	Unlike original patent claim 44, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conductive material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."  Unlike original patent claim 44, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein the noble metal is platinum."
Presented Reissue Claim	69	69
Original Patent Claim	43	4

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Differences in Claim Language	Unlike original patent claim 45, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 45, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein the at least one of the sensing, counter, first pump, and second pump electrodes is substantially comprised of proton conductive material."	Unlike original patent claim 46, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 46, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein at least one of the first and second protonic conductive electrolyte membranes is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	69		69	
Original Patent Claim	45		46	

Original Patent Claim	Presented Reissue Claim	Differences in Claim Language
47	69	Unlike original patent claim 47, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 47, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein at least one of the first and second protonic conductive electrolyte membranes is a hydrated metal oxide protonic conductive electrolyte membrane."
48	69	Unlike original patent claim 48, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 48, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrical conducting material of at least one of said sensing, counter, first pump, and second pump electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."

Presented Reissue Claim	Unlike original patent claim 49, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 49, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for said at least one of the sensing, counter, first pump, and second pump electrodes is a copolymer having a tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 50, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 50, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing, counter, first pump, and second pump electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing, counter, first pump and second pump electrodes is about 1-50 wt % of platinum."
Original Patent Claim	49		50	

Original	Presented	Differences in Claim Language
Patent Claim	Keissue Claim	
51	69	Unlike original patent claim 51, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-
		electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 51, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing, counter, first pump, and second pump electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the
		sensing, counter, first pump, and second pump electrodes is about 1-50 wt % of Ru oxide."
52	69	Unlike original patent claim 52, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode
		being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language
		electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first
		and a second electrical conductor material."
		Unlike original patent claim 52, presented reissue claim 69 does not recite the language "quantitative
		measurement," and does not recite the language "a reference electrode permeable to water vapor and comprised of an electrical conducting material; a counter electrode permeable to water vapor and comprised of an electrical
		conducting material and being separate from both said sensing and reference electrodes, and being exposed to the
		ambient atmosphere; a protonic conductive electrolyte membrane permeable to water vapor, having top and hottom sides said hottom side of said protonic conductive membrane being in contact with the counter electrode
		and the top side of said protonic conductive membrane being in contact with the sensing and reference
		electrodes;" and also does not recite the language "wherein the electrical conducting material of at least one of
		said sensing, counter, and reference electrodes is a proton-electron mixed conductive material having 10-50 wt %
		of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."

Differences in Claim Language	Unlike original patent claim 53, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 53, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "further comprising: means for applying a DC power across said protonic electrolyte membrane in electrical contact between the sensing electrode and said counter electrode, whereby the gas is transported away from the counter electrode when the DC power means applies a DC power across said protonic electrolyte membrane."	Unlike original patent claim 54, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 54, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein said means for exposing a surface of said counter electrode to said water vapor further contains an antifreeze additive."
Presented Reissue Claim	69		69	
Original Patent Claim	53		54	

ed Differences in Claim Language	Unlike original patent claim 55, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 55, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein the surface of said sensing electrode that is exposed to the ambient atmosphere has a surface area smaller than the surface area of the surface of the counter electrode that is exposed to said water vapor, whereby the first protonic conductive electrolyte membrane is exposed to substantially 100 percent relative humidity, and a positive pressure of said water vapor exists from the surface of said counter electrode that is exposed to said water vapor to the surface of said sensing electrode that is exposed to the ambient atmosphere."	Unlike original patent claim 56, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 56, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein at least one of the surfaces of said protonic conductive electrolyte membrane in contact with one of the sensing, counter, and reference
Presented Reissue Claim	69		69	
Original Patent Claim	55		95	

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
57	69	Unlike original patent claim 57, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the
		counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and
		also recites the language "wherein the electrical conducting material of at least one of said sensing and
		counter electrodes is a proton-electron mixed conductive material naving 10-50 wt % of a proton
		COLIGIACIO MACCIAL AMO 20-30 W 70 OF A 11131 AMO A SCCOMO CICCLICAL COMOCICIO MACCIAL.
		Unlike original patent claim 57, presented reissue claim 69 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein one of the first and second electrical
		conductor materials for said at least one of the sensing, counter, first pump, and second pump electrodes
		is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials
		for said at least one of the sensing, counter, first pump, and second pump electrodes is about 1-50 wt %
		of Ru oxide."
		Unlike original patent claim 58, presented reissue claim 69 recites the language "an electrochemical gas
58	69	sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the
		counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and
		also recites the language "wherein the electrical conducting material of at least one of said sensing and
		counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton
		conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 58, presented reissue claim 69 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein at least one of the sensing, counter, and
		reference electrodes is comprised of film having a thickness in the range of about 50 Angstroms to
		10,000 Angstroms."

Differences in Claim Language		measurement," and also does not recite the language "wherein the film is substantially composed of a noble metal."  Unlike original patent claim 60, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton	conductor material and 50-90 wt % of a first and a second electrical conductor material."  Unlike original patent claim 60, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein the noble metal is platinum."
Presented Reissne Claim	69	69	
Original Patent Claim	59	09	

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
61	69	Unlike original patent claim 61, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the
		counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and
		counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton
		conductor material and 30-90 Wt % of a first and a second electrical conductor material.
		Unlike original patent claim 61, presented reissue claim 69 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the protonic conductive electrolyte
	•	membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
		Unlike original patent claim 62, presented reissue claim 69 recites the language "an electrochemical gas
62	69	sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the
		counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and
		also recites the language "wherein the electrical conducting material of at least one of said sensing and
		counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton
		conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 62, presented reissue claim 69 does not recite the language "quantitative
	•	measurement," and also does not recite the language "wherein the protonic conductive electrolyte
		membrane is a hydrated metal oxide protonic conductor electrolyte membrane."

Original Patent Claim	Presented Reissue Claim	Differences in Claim Language
63	69	Unlike original patent claim 63, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 63, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for said at least one of the sensing, counter, and reference electrodes is a copolymer having a tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
64	69	Unlike original patent claim 64, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 64, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing, counter, and reference electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing, counter, and reference electrodes is about 1-50 wt % of platinum."

nted Differences in Claim Language Claim	Unlike original patent claim 65, presented reissue claim 69 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 65, presented reissue claim 69 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing, counter, and reference electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing, counter, and reference electrodes is about 1-50 wt % of Ru oxide."
Presented Reissue Claim	69	
Original Patent Claim	99	

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
-	02	Unlike original patent claim 1, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language
1	) -	"the sensing electrode and the counter electrode being on opposite sides of the first protonic
		conductive electrolyte membrane," and also recites the language "the sensing electrode and
		the counter electrode are the only two electrodes in contact with the first protonic conductive
		electrolyte membrane."
		Unlike original patent claims 1, presented reissne claim 70 does not recite the language
		"quantitative measurement."
		Unlike original patent claim 2, presented reissue claim 70 recites the language "an
2	70	electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language
		"the sensing electrode and the counter electrode being on opposite sides of the first protonic
		conductive electrolyte membrane," and also recites the language "the sensing electrode and
		the counter electrode are the only two electrodes in contact with the first protonic conductive
		electrolyte membrane."
		Unlike original patent claim 2, presented reissue claim 70 does not recite the language
		"quantitative measurement," or the language "wherein said water vapor containing means
		contains a volume of water and an antifreeze additive."

Original	Presented	Differences in Claim Language
3	70	Unlike original patent claim 3, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 3, presented reissue claim 70 does not recite the language "quantitative measurement," and does not recite the language "wherein the surface of said sensing electrode that is exposed to the ambient atmosphere has a surface area that is smaller than the surface area of the surface of the counter electrode that is exposed to said water vapor, whereby the first protonic conductive electrolyte membrane is exposed to substantially 100 percent relative humidity, and a positive pressure of said water vapor exists from the surface of said counter electrode exposed to said water vapor to the surface of said sensing electrode exposed to the ambient atmosphere."
4	70	Unlike original patent claim 4, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 4, presented reissue claim 70 does not recite the language "quantitative measurement," and does not recite the language "wherein the surface area of the surface of the counter electrode that is exposed to said water vapor is separated from said means for exposing a surface of said counter electrode to said water vapor by a hydrophobic membrane permeable to water vapor and substantially impervious to water."

Original Patent Claim	Presented Reissue Claim	Differences in Claim Language
8	70	Unlike original patent claim 5, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 5, presented reissue claim 70 does not recite the language "quantitative measurement," and does not recite the language "wherein the first protonic conductive electrolyte membrane has opposing surfaces, each of said opposing surfaces being in contact with one of the sensing and counter electrodes, wherein at least one of the opposing surfaces of said first protonic conductive electrolyte membrane in contact with one of the sensing and counter electrodes is substantially nonplanar."
9	70	Unlike original patent claim 6, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 6, presented reissue claim 70 does not recite the language "quantitative measurement," and does not recite the language "wherein at least one of the sensing and counter electrodes is comprised of film having a thickness in the range of about 50 Angstroms to 10,000 Angstroms."

nted Differences in Claim Language	Claim	Unlike original patent claim 7, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."  Unlike original patent claim 7, presented reissue claim 70 does not recite the language "wherein the film is	Substantially composed of a noble metal."  Unlike original patent claim 8, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."  Unlike original patent claim 8, presented reissue claim 70 does not recite the language "quantitative measurement," and does not recite the language "wherein the noble metal is platinum."
Presented	Reissue Claim	70	70
Original	Patent Claim	7	∞

Presented Differences in Claim Language Reissue Claim	Unlike original patent claim 9, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 9, presented reissue claim 70 does not recite the language "quantitative measurement," and does not recite the language "wherein the first protonic conductive electrolyte membrane is substantially composed of a solid, perfluorinated, ionexchange polymer."	Unlike original patent claim 10, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 10, presented reissue claim 70 does not recite the language "quantitative measurement," and does not recite the language "wherein the first protonic conductive electrolyte membrane is a hydrated metal oxide protonic conductor electrolyte membrane."
Original Patent Claim	6		10	

Original Patent Claim 11 12	Presented Reissue Claim 70 70	Unlike original patent claim 11, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."  Unlike original patent claim 11, presented reissue claim 70 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for said at least one of the sensing and counter electrodes is a copolymer having a tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."  Unlike original patent claim 12, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."  Unlike original patent claim 12, presented reissue claim 70 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first
		and second electrical conductor materials for said at least one of the sensing and counter electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing and counter electrodes is about 1-50 wt % of platinum."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
13	70	Unlike original patent claim 13, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 13, presented reissue claim 70 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing and counter electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing and counter electrodes is about 1-50 wt % of Ru oxide."
14	70	Unlike original patent claim 14, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 14, presented reissue claim 70 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor further comprises: first and second pump electrodes comprised of an electrical conducting material permeable to water vapor, separate from said sensing and counter electrodes, and situated on opposite sides of and in contact with said first protonic conductive electrolyte membrane as the counter electrode being situated on the same side of said first protonic conductive membrane as the counter electrode and having a surface thereon exposed to the water vapor in said means for exposing a surface of said counter electrode to said water vapor; and means for applying a DC power across the first protonic conductive electrolyte membrane, said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across the first protonic conductive electrolyte membrane; whereby the gas is transported away from the counter electrode when the DC power means applies a DC power to the first and second pump electrodes."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
15	70	Unlike original patent claim 15, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic
		conductive electrolyte membrane," and also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 15, presented reissue claim 70 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrical conducting material of the first and second pump electrodes is substantially composed of carbon."
16	70	Unlike original patent claim 16, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 16, presented reissue claim 70 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrical conducting material of the first and second pump electrodes is substantially composed of noble metals."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
17	70	Unlike original patent claim 17, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language
		"the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode and
		the counter electrode are the only two electrodes in contact with the first protonic conductive
		electrolyte membrane."
		Unlike original patent claim 17, presented reissue claim 70 does not recite the language
		"quantitative measurement," and also does not recite the language "wherein the electrical
		conducting material of the first and second pump electrodes is substantially composed of
		conductive hydiated inetal oxides.
		Unlike original patent claim 18, presented reissue claim 70 recites the language "an
18	70	electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language
		"the sensing electrode and the counter electrode being on opposite sides of the first protonic
		conductive electrolyte membrane," and also recites the language "the sensing electrode and
		the counter electrode are the only two electrodes in contact with the first protoine conductive electrolyte membrane."
		Unlike original patent claim 18, presented reissue claim 70 does not recite the language
		"quantitative measurement," and also does not recite the language "Wherein at least one of
		of about 50 Angstroms to 10,000 Angstroms."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
19	70	Unlike original patent claim 19, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 19, presented reissue claim 70 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrical conducting material of said first and second pump electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
20	70	Unlike original patent claim 20, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 20, presented reissue claim 70 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the first and second pump electrodes is a copolymer having a tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
21	70	Unlike original patent claim 21, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language
		"the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode and
		the counter electrode are the only two electrodes in contact with the first protonic conductive
		electrolyte membrane."
		Unlike original patent claim 21, presented reissue claim 70 does not recite the language
		"quantitative measurement," and also does not recite the language "wherein one of the first
		and second electrical conductor materials for the first pump electrode is about 50-99 wt % of
		carbon black, and the other of the first and second electrical conductor materials for the first
		pump electrode is 1 to 50 wt % of platinum."
		Unlike original patent claim 22, presented reissue claim 70 recites the language "an
22	70	electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language
		"the sensing electrode and the counter electrode being on opposite sides of the first protonic
		conductive electrolyte membrane," and also recites the language "the sensing electrode and
		the counter electrode are the only two electrodes in contact with the first protonic conductive
		electrolyte membrane."
		Unlike original patent claim 22, presented reissue claim 70 does not recite the language
		"quantitative measurement," and also does not recite the language "wherein one of the first
		and second electrical conductor materials for the second pump electrode is about 50-99 wt %
		of carbon black, and the other of the first and second electrical conductor materials for the
		second pump electrode is 1 to 50 wt % of Ru oxide."

Original	Presented	Differences in Claim Language
Patent Claim 23	Keissue Claim 70	Unlike original patent claim 23, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 23, presented reissue claim 70 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor further comprises: a second protonic conductive electrolyte membrane permeable to water vapor; first and second pump electrodes permeable to water vapor and comprised of an electron conductive material, and being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane, said means for exposing a surface of said counter electrode to said water vapor exposing a surface of said second pump electrode having a surface exposed to the ambient atmosphere; and means for applying a DC power across said second protonic electrolyte membrane, said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across said second protonic electrolyte membrane; whereby the gas is transported away from the counter electrode when the DC power means applies a DC power to the first and second pump electrodes."
24	70	Unlike original patent claim 24, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."  Unlike original patent claim 24, presented reissue claim 70 does not recite the language "quantitative measurement," and also does not recite the language "wherein the second protonic conductive electrolyte membrane is substantially composed of a solid, perfluorinated, ion-exchange polymer."

Presented Differences in Claim Language Reissue Claim	Unlike original patent claim 25, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 25, presented reissue claim 70 does not recite the language "quantitative measurement," and also does not recite the language "wherein the second protonic conductive electrolyte membrane is a hydrated metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 26, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 26, presented reissue claim 70 does not recite the language "quantitative measurement," and also does not recite the language "wherein the surface area of the surface of said first pump electrode that is exposed to the ambient atmosphere is smaller than the surface area of the surface of the second pump electrode that is exposed to said water vapor, whereby the second protonic conductive electrolyte membrane is exposed to substantially 100 percent relative humidity, and a positive pressure of said water vapor exists from the surface of said second pump electrode that is exposed to said water vapor to the surface of said first pump electrode that is exposed to the ambient atmosphere."
Pres Reissu				
Original Patent Claim	25		26	

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
27	70	Unlike original patent claim 27, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 27, presented reissue claim 70 does not recite the language "quantitative measurement," and also doe snot recite the language "wherein the surface area of the surface of the second pump electrode that is exposed to said water vapor is separated from said means for exposing a surface of said counter electrode to said water vapor by a hydrophobic membrane permeable to water vapor and substantially impervious to water."
28	70	Unlike original patent claim 28, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."
		Unlike original patent claim 28, presented reissue claim 70 does not recite the language "quantitative measurement," and also does not recite the language "further comprising: means for applying a DC pulse power source across the first protonic conductive membrane, said sensing and counter across the first protonic conductive membrane; and switch means for alternating the connection between the sensing and counter electrodes from the electrical measurement means to the DC pulse power means; whereby, in a positive ambient atmosphere concentration of said gas, said electrical measurement means detects changes in said electrical characteristic when said switch means connects said electrical measurement means to the sensing and counter electrodes; and whereby said DC pulse power means moves the gas away from a side of the gas sensor where the counter electrode is placed when said switch means connects said DC pulse power means to the sensing and counter electrodes."

Differences in Claim Language		Unlike original patent claim 29, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 29, presented reissue claim 70 does not recite the language "quantitative measurement," and also does not recite the language "wherein the gas is CO."	Unlike original patent claim 30, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."  Unlike original patent claim 30, presented reissue claim 70 does not recite the language "quantitative measurement," and also does not recite the language "wherein the gas is NO _x ."
Presented	Reissue Claim	70		
Original	Patent Claim	29		30

	Ne eccen	E 9 0 7 9
Differences in Claim Language	Unlike original patent claim 31, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."  Unlike original patent claim 31, presented reissue claim 70 does not recite the language "quantitative measurement," and also does not recite the language "wherein the gas is	Unlike original patent claim 32, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."  Unlike original patent claim 32, presented reissue claim 70 does not recite the language "wherein the gas is H ₂ S."
Presented Reissue Claim	70	70
Original Patent Claim	31	32

	ge "an nguage rotonic ode and ductive	nguage is H ₂ O	ge "an nguage rotonic ode and ductive
Differences in Claim Language	Unlike original patent claim 33, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."	Unlike original patent claim 33, presented reissue claim 70 does not recite the language "quantitative measurement," and also does not recite the language "wherein the gas is H ₂ O vapor."	Unlike original patent claim 34, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane."  Unlike original patent claim 34, presented reissue claim 70 does not recite the language "quantitative measurement," and also does not recite the language "wherein the gas is alcohol vapor."
Presented Reissue Claim	70		70
Original Patent Claim	33		34

Differences in Claim Language	Unlike original patent claim 35, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 35, presented reissue claim 70 does not recite the language "quantitative measurement," does not recite the language "a second protonic conductive electrolyte membrane permeable to water vapor;" does not recite the language "and said first pump electrode having a surface exposed to the ambient atmosphere, said second pump electrode being separated from said counter electrode by said means for exposing a surface of said second pump electrode to said water vapor, and said counter electrode having a surface exposed to said water vapor by said means for exposing a surface of said second pump electrode to said water vapor," and also does not recite the language "means for applying a DC power across said second protonic electrolyte membrane in electrical contact with said first and second pump electrodes; whereby the gas is transported away from the counter electrode when the DC power means applies a DC power across said second protonic electrolyte membrane."	Unlike original patent claim 36, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 36, presented reissue claim 70 does not recite the language "quantitative measurement," and also does not recite the language "wherein at least one of said first and second protonic conductive electrolyte membranes is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	70		70	
Original Patent Claim	35		36	

Original	Presented	Differences in Claim Language
37	70	Unlike original patent claim 37, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 37, presented reissue claim 70 does not recite the language "quantitative measurement," and also does not recite the language "wherein at least one of the first and second protonic conductive electrolyte membranes is a hydrated metal oxide protonic conductor electrolyte membranes."
38	70	Unlike original patent claim 38, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 38, presented reissue claim 70 does not recite the language "quantitative measurement," and also does not recite the language "wherein the surface of said first pump electrode that is exposed to the ambient atmosphere has a surface area smaller than the surface area of the surface of the second pump electrode that is exposed to said water vapor, and wherein the surface of said sensing electrode that is exposed to said water vapor, whereby the first protonic conductive electrolyte membrane is exposed to substantially 100 percent relative humidity, a positive pressure of said water vapor exists from the surface of said counter electrode that is exposed to said water vapor to the surface of said sensing electrode that is exposed to substantially 100 percent relative humidity, and a positive pressure of said water vapor exists from the surface of said second pump electrode that is exposed to said water vapor to the surface of said first pump electrode that is exposed to said water vapor to the surface of said first pump electrode that is exposed to the ambient atmosphere."

Differences in Claim Language	Unlike original patent claim 41, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 41, presented reissue claim 70 does not recite the language "quantitative measurement," and also does not recite the language "wherein at least one of the surfaces of said first protonic conductive electrolyte membrane in contact with one of the sensing and counter electrodes is substantially nonplanar, and wherein at least one of the surfaces of said second protonic conductive electrolyte membrane in contact with one of the first and second pump electrodes is substantially nonplanar."	Unlike original patent claim 42, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 42, presented reissue claim 70 does not recite the language "quantitative measurement," and also does not recite the language "wherein at least one of the sensing, counter, first pump, and second pump electrodes is comprised of film having a thickness in the range of about 50 Angstroms to 10,000 Angstroms."
Presented Reissue Claim	70		70	
Original Patent Claim	41		42	

Original	Presented	Differences in Claim Language
ratellt Claill	NGISSUC CIAIIII	
	j	Unlike original patent claim 45, presented reissue claim 70 recites the language "an electrochemical
45	70	gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode
		and the counter electrode being on opposite sides of the first protonic conductive electrolyte
		membrane," also recites the language the sensing electrode and the counter electrode are the only
		two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites
		the language "wherein the electrical conducting material of at least one of said sensing and counter
		electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor
		material and 50-90 wt % of a first and a second electrical conductor material."
	·····	Unlike original patent claim 45, presented reissue claim 70 does not recite the language
		"quantitative measurement," and also does not recite the language "wherein the at least one of the
		sensing, counter, first pump, and second pump electrodes is substantially comprised of proton conductive material."
		Unlike original patent claim 46, presented reissue claim 70 recites the language "an electrochemical
46	70	gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode
		and the counter electrode being on opposite sides of the first protonic conductive electrolyte
		membrane," also recites the language the sensing electrode and the counter electrode are the only
		two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites
		the language "wherein the electrical conducting material of at least one of said sensing and counter
		electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor
		material and 50-90 wt % of a first and a second electrical conductor material."
		The second section is a second section of the second section of the second section is a second section of the second section is a second section of the second section
		Unlike original patent claim 46, presented reissue claim /0 does not recite the language
		qualititative illeasurellity, and also does not resite are language, wherein at reast one of the most
		perfluorinated, ion-exchange polymer."

Differences in Claim Language	Unlike original patent claim 47, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 47, presented reissue claim 70 does not recite the language "quantitative measurement," and also does not recite the language "wherein at least one of the first and second protonic conductive electrolyte membranes is a hydrated metal oxide protonic conductive electrolyte membrane."	Unlike original patent claim 48, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 48, presented reissue claim 70 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrical conducting material of at least one of said sensing, counter, first pump, and second pump electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
Presented Reissue Claim	70		70	
Original Patent Claim	47		48	

Differences in Claim Language	Unlike original patent claim 49, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conductive material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."  Unlike original patent claim 49, presented reissue claim 70 does not recite the language "wherein the proton conductor material for said of least one of the sensing counter first minn," and also does not recite the language "wherein the proton conductor material for said of least one of the sensing counter first minn," and also does not recite the language "wherein the proton conductor material for said of least one of the sensing counter first minn," and also does not recite the language "wherein the proton conductor material".	Containing at least one of a sulfonic acid group or a carboxylic acid group."  Unlike original patent claim 50, presented reissue claim 70 recites the language "the sensing electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conductive material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."  Unlike original patent claim 50, presented reissue claim 70 does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing, counter, first pump, and second electrical conductor materials for said at least one of the sensing, counter, first pump and second electrical conductor materials for said at least one of the sensing, counter, first pump and second electrical conductor materials for said at least one of the sensing, counter, first pump and second electrical conductor materials for said at least one of the sensing, counter, first pump and second pump electrodes is about 1-50 wt % of platinum."
Presented Reissue Claim	70	70
Original Patent Claim	49	50

Patent Claim Reissue Claim 51 70	aim
	+
	Unlike original patent claim 51, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode
	being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic
	conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at
	% of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
	Unlike original patent claim 51, presented reissue claim 70 does not recite the language "quantitative
	measurement," and also does not recite the language "wherein one of the first and second electrical conductor
	materials for said at least one of the sensing, counter, first pump, and second pump electrodes is about 50-99 wt
	% of carbon black, and the other of the first and second electrical conductor materials for said at least one of the
	Unlike original patent claim 52, presented reissue claim 70 recites the language "an electrochemical gas sensor
52 70	for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode
	being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language the
	sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic
	Collidative electrolyte inclinitative, and also recites are larguage. Wherein the electrical conducting material having 10-50 wt
	% of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
	Unlike original patent claim 52, presented reissue claim 70 does not recite the language "quantitative
	measurement," and does not recite the language "a reference electrode permeable to water vapor and comprised
	of an electrical conducting material; a counter electrode permeable to water vapor and comprised of an electrical conducting material and being separate from both said sensing and reference electrodes and being exposed to the
	ambient atmosphere; a protonic conductive electrolyte membrane permeable to water vapor, having top and
	•
	and the top side of said protonic conductive membrane being in contact with the sensing and reference
	electrodes;" and also does not recite the language "wherein the electrical conducting material of at least one of
-	said sensing, counter, and reference electrodes is a proton-electron mixed conductive material having 10-50 wt %
	of a proton conductor material and 20-40 Wt % of a lifst and a second electrical conductor material.

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
53	70	Unlike original patent claim 53, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the
		counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also
		recites the language the sensing electrode and the counter electrode are the only two electrodes in
		the electrical conducting material of at least one of said sensing and counter electrodes is a proton-
		of a first and a second electrical conductor material.
		Unlike original patent claim 53, presented reissue claim 70 does not recite the language "quantitative
		measurement," and also does not recite the language "further comprising: means for applying a DC
		power across said protonic electrolyte membrane in electrical contact between the sensing electrode and
		said counter electrode, whereby the gas is transported away from the counter electrode when the DC
		power means applies a DC power across said protonic electrolyte membrane."
	-	Unlike original patent claim 54, presented reissue claim 70 recites the language "an electrochemical gas
54	70	sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the
		counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also
		recites the language the sensing electrode and the counter electrode are the only two electrodes in
		the electrical conducting material of at least one of said sensing and counter electrodes is a proton-
		electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt %
		of a first and a second electrical conductor material."
		Unlike original patent claim 34, presented reissue claim /0 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein said means for exposing a surface of said
		counter electrode to said water vapor further contains an antifreeze additive."

Differences in Claim Language	Unlike original patent claim 55, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a protonelectron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 55, presented reissue claim 70 does not recite the language "quantitative measurement," and also does not recite the language "wherein the surface of said sensing electrode that is exposed to the surface area smaller than the surface area of the surface of the counter electrode that is exposed to said water vapor, whereby the first protonic conductive electrolyte membrane is exposed to substantially 100 percent relative humidity, and a positive pressure of said water vapor exists from the surface of said counter electrode that is exposed to said water vapor to the surface of said sensing electrode that is exposed to the ambient atmosphere."	Unlike original patent claim 56, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conductive material of at least one of said sensing and counter electrodes is a protonelectron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 56, presented reissue claim 70 does not recite the language "quantitative measurement," and also does not recite the language "wherein at least one of the surfaces of said protonic conductive electrolyte membrane in contact with one of the sensing, counter, and reference electrodes is substantially nonplanar."
Presented Reissue Claim	70		70	
Original Patent Claim	55		99	

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
57	70	Unlike original patent claim 57, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the
		counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also
		contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein
		the electrical conducting material of at least one of said sensing and counter electrodes is a proton-
		electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 57, presented reissue claim 70 does not recite the language "quantitative"
		measurement," and also does not recite the language "wherein one of the first and second electrical
		is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials
		for said at least one of the sensing, counter, first pump, and second pump electrodes is about 1-50 wt %
		of Ru oxide."
		Unlike original patent claim 58, presented reissue claim 70 recites the language "an electrochemical gas
58	70	sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the
		counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also
		recites the language the sensing electrode and the counter electrode are the only two electrodes in
		~~
		the electrical conducting material of at least one of said sensing and counter electrodes is a proton-
		electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt %
		of a first and a second electrical conductor material."
		Unlike original patent claim 58, presented reissue claim 70 does not recite the language "quantitative"
		measurement," and also does not recite the language "wherein at least one of the sensing, counter, and
		reference electrodes is comprised of film having a thickness in the range of about 50 Angstroms to
		10,000 Angstroms."

Differences in Claim Language	Unlike original patent claim 59, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a protonelectron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 59, presented reissue claim 70 does not recite the language "quantitative measurement," and also does not recite the language "wherein the film is substantially composed of a noble metal."	Unlike original patent claim 60, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conductive material of at least one of said sensing and counter electrodes is a protonelectron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."  Unlike original patent claim 60, presented reissue claim 70 does not recite the language "quantitative measurement," and also does not recite the language "wherein the noble metal is platinum."
Presented Reissue Claim	70		70
Original Patent Claim	59		09

Differences in Claim Language	Unlike original patent claim 61, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrody membrane," also recites the language the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a protonelectron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 61, presented reissue claim 70 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."	Unlike original patent claim 62, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a protonelectron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 62, presented reissue claim 70 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is a hydrated metal oxide protonic conductor electrolyte membrane."
Presented Reissue Claim	70		70	
Original Patent Claim	61		62	

Differences in Claim Language	Unlike original patent claim 63, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a protonelectron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 63, presented reissue claim 70 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for said at least one of the sensing, counter, and reference electrodes is a copolymer having a tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 64, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a protonelectron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 64, presented reissue claim 70 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing, counter, and reference electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing, counter, and reference electrodes is about 1-50 wt % of platinum."
Presented Reissue Claim	70		70	
Original Patent Claim	63		64	

Differences in Claim Language	Unlike original patent claim 65, presented reissue claim 70 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrodyte membrane," and also recites the language the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "wherein the electrical conductive material of at least one of said sensing and counter electrodes is a protonelectron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."  Unlike original patent claim 65, presented reissue claim 70 does not recite the language "wherein one of the first and second electrical	conductor materials for said at least one of the sensing, counter, and reference electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing, counter, and reference electrodes is about 1-50 wt % of Ru oxide."
Presented Reissue Claim	70	
Original Patent Claim	65	

Original	Presented	Differences in Claim Language
1 avent Cianni	Iversone Cianni	Unlike original natent claim 1 presented reissue claim 71 recites the language "an
	71	electrochemical gas sensor for sensing a gas in an ambient atmosphere," also recites the
		language "the sensing electrode and the counter electrode being on opposite sides of the first
		protonic conductive electrolyte membrane, and also recites the language "the sensing
		electrode reacts with the gas to produce a change in electrical characteristic between the
		sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode."
		Unlike original patent claims 1, presented reissue claim 71 does not recite the language
		"quantitative measurement."
		Unlike original patent claim 2, presented reissue claim 71 recites the language "an
2	71	electrochemical gas sensor for sensing a gas in an ambient atmosphere," also recites the
		language "the sensing electrode and the counter electrode being on opposite sides of the first
		protonic conductive electrolyte membrane, and also recites the language "the sensing
		electrode reacts with the gas to produce a change in electrical characteristic between the
		sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode."
		Unlike original patent claim 2, presented reissue claim 71 does not recite the language
		"quantitative measurement," or the language "wherein said water vapor containing means
		contains a volume of water and an antifreeze additive."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
3	71	Unlike original patent claim 3, presented reissue claim 71 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere," also recites the
		language "the sensing electrode and the counter electrode being on opposite sides of the first
		protonic conductive electrolyte memorane, and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the
		sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode."
-		Unlike original patent claim 3, presented reissue claim 71 does not recite the language
		"quantitative measurement," and does not recite the language "wherein the surface of said
		sensing electrode that is exposed to the ambient atmosphere has a surface area that is smaller
	·	than the surface area of the surface of the counter electrode that is exposed to said water was a whereby the first protonic conductive electrolyte membrane is exposed to
		substantially 100 percent relative humidity, and a positive pressure of said water vapor exists
		from the surface of said counter electrode exposed to said water vapor to the surface of said
		sensing electrode exposed to the ambient atmosphere."
		Unlike original patent claim 4, presented reissue claim 71 recites the language "an
4	71	electrochemical gas sensor for sensing a gas in an ambient atmosphere," also recites the
		language "the sensing electrode and the counter electrode being on opposite sides of the first
		protonic conductive electrolyte membrane, and also recites the language "the sensing
		sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode."
		Unlike original patent claim 4, presented reissue claim 71 does not recite the language
		"quantitative measurement," and does not recite the language "wherein the surface area of
		the surface of the counter electrode that is exposed to said water vapor is separated from said
		means for exposing a surface of said counter electrode to said water vapor by a hydrophobic
		HEIDDIANIE PETITICADIE 10 WATER VAPOI AND SUBSTAINTANTY IMPERATORS 10 WATER.

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
5	71	Unlike original patent claim 5, presented reissue claim 71 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere," also recites the
		language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane, and also recites the language "the sensing
		electrode reacts with the gas to produce a change in electrical characteristic between the
		sensing electrode and the counter electrode in the absence of an applied voltage to the
		Unlike original patent claim 5, presented reissue claim 71 does not recite the language
		"quantitative measurement," and does not recite the language "wherein the first protonic
		conductive electrolyte membrane has opposing surfaces, each of said opposing surfaces
		being in contact with one of the sensing and counter electrodes, wherein at least one of the
		opposing surfaces of said first protonic conductive electrolyte membrane in contact with one
		of the sensing and counter electrodes is substantially nonplanar."
		Unlike original patent claim 6, presented reissue claim 71 recites the language "an
9	71	electrochemical gas sensor for sensing a gas in an ambient atmosphere," also recites the
		language "the sensing electrode and the counter electrode being on opposite sides of the first
		protonic conductive electrolyte membrane, and also recites the language "the sensing
		electrode reacts with the gas to produce a change in electrical characteristic between the
		sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode."
		Unlike original patent claim 6. presented reissue claim 71 does not recite the language
		"quantitative measurement," and does not recite the language "wherein at least one of the
		sensing and counter electrodes is comprised of film having a thickness in the range of about
		50 Angstroms to 10,000 Angstroms."

Differences in Claim Language	Unlike original patent claim 7, presented reissue claim 71 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane, and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."  Unlike original patent claim 7, presented reissue claim 71 does not recite the language "wherein the film is	
Presented Reissue Claim	71	71
Original Patent Claim	7	<b>∞</b>

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
		Unlike original patent claim 9, presented reissue claim 71 recites the language "an
6	71	electrochemical gas sensor for sensing a gas in an ambient atmosphere," also recites the
		language "the sensing electrode and the counter electrode being on opposite sides of the first
		protonic conductive electrolyte membrane, and also recites the language "the sensing
		electrode reacts with the gas to produce a change in electrical characteristic between the
		sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode."
		Unlike original patent claim 9, presented reissue claim 71 does not recite the language
		"quantitative measurement," and does not recite the language "wherein the first protonic
		conductive electrolyte membrane is substantially composed of a solid, perfluorinated, ion-
		Unlike original patent claim 10, presented reissue claim 71 recites the language "an
10	71	electrochemical gas sensor for sensing a gas in an ambient atmosphere," also recites the
		language "the sensing electrode and the counter electrode being on opposite sides of the first
		protonic conductive electrolyte membrane, and also recites the language "the sensing
		electrode reacts with the gas to produce a change in electrical characteristic between the
		sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode."
		Unlike original patent claim 10, presented reissue claim 71 does not recite the language
		"quantitative measurement," and does not recite the language "wherein the first protonic
		conductive electrolyte membrane is a hydrated metal oxide protonic conductor electrolyte membrane."

Differences in Claim Language	Unlike original patent claim 11, presented reissue claim 71 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane, and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."  Unlike original patent claim 11, presented reissue claim 71 does not recite the language	"quantitative measurement," and also does not recite the language "wherein the proton conductor material for said at least one of the sensing and counter electrodes is a copolymer having a tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 12, presented reissue claim 71 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane, and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 12, presented reissue claim 71 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing and counter electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing and counter electrodes is about 1-50 wt % of platinum."
Presented Reissue Claim	71		71	
Original Patent Claim	<i>4</i>		12	

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
13	71	Unlike original patent claim 13, presented reissue claim 71 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane, and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 13, presented reissue claim 71 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing and counter electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing and counter electrodes is about 1-50 wt % of Ru oxide."
14	71	Unlike original patent claim 14, presented reissue claim 71 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane, and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 14, presented reissue claim 71 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor further comprises: first and second pump electrodes comprised of an electrical conducting material permeable to water vapor, separate from said sensing and counter electrodes, and situated on opposite sides of and in contact with said first protonic conductive electrolyte membrane, said second pump electrode being situated on the same side of said first protonic conductive membrane as the counter electrode and having a surface thereon exposed to the water vapor in said means for exposing a surface of said counter electrolyte membrane, said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across the first protonic conductive electrolyte membrane; whereby the gas is transported away from the counter electrode when the DC power means applies a DC power to the first and second pump electrodes."
		when the DC power means applies a DC power to the first and second pump electrodes."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
15	71	Unlike original patent claim 15, presented reissue claim 71 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere," also recites the
		language "the sensing electrode and the counter electrode being on opposite sides of the first
		protonic conductive electrolyte membrane, and also recites the language "the sensing
		sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode."
		Unlike original patent claim 15, presented reissue claim 71 does not recite the language
		"quantitative measurement," and also does not recite the language "wherein the electrical
		conducting material of the first and second pump electrodes is substantially composed of carbon."
		Unlike original patent claim 16, presented reissue claim 71 recites the language "an
16	71	electrochemical gas sensor for sensing a gas in an ambient atmosphere," also recites the
		language "the sensing electrode and the counter electrode being on opposite sides of the first
		protonic conductive electrolyte membrane, and also recites the language "the sensing
		electrode reacts with the gas to produce a change in electrical characteristic between the
		sensing electrode."
		Unlike original patent claim 16, presented reissue claim 71 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrical
		conducting material of the first and second pump electrodes is substantially composed of
		noble metals.

Differences in Claim Language	Unlike original patent claim 17, presented reissue claim 71 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane, and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."  Unlike original patent claim 17, presented reissue claim 71 does not recite the language "wherein the electrical conducting material of the first and second pump electrodes is substantially composed of	Unlike original patent claim 18, presented reissue claim 71 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane, and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."  Unlike original patent claim 18, presented reissue claim 71 does not recite the language "wherein at least one of the first and second pump electrodes is comprised of a film having a thickness in the range of about 50 Angstroms to 10,000 Angstroms."
Presented Reissue Claim	7.1	71
Original Patent Claim	17	18

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
19	71	Unlike original patent claim 19, presented reissue claim 71 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere," also recites the
		language "the sensing electrode and the counter electrode being on opposite sides of the first
		problems conductive electrolyte inferiorate, and also recites the language the sensing electrode reacts with the gas to produce a change in electrical characteristic between the
		sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode."
		Unlike original patent claim 19, presented reissue claim 71 does not recite the language
		"quantitative measurement," and also does not recite the language "wherein the electrical
		conducting material of said first and second pump electrodes is a proton-electron mixed
		conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a
		first and a second electrical conductor material."
		Unlike original patent claim 20, presented reissue claim 71 recites the language "an
20	71	electrochemical gas sensor for sensing a gas in an ambient atmosphere," also recites the
		language "the sensing electrode and the counter electrode being on opposite sides of the first
		protonic conductive electrolyte membrane, and also recites the language "the sensing
		electrode reacts with the gas to produce a change in electrical characteristic between the
		sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode."
		Unlike original patent claim 20, presented reissue claim 71 does not recite the language
		"quantitative measurement," and also does not recite the language "wherein the proton
		conductor material for both the first and second pump electrodes is a copolymer having a
		tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing at
		least one of a sulfonic acid group or a carboxylic acid group."

Original 23 24	Presented Reissue Claim 71	Unlike original patent claim 23, presented reissue claim 71 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane, and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."  Unlike original patent claim 23, presented reissue claim 71 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor further comprises: a second protonic conductive electrolyte membrane permeable to water vapor and comprised of an electron conductive material, and being separate from said sensing and counter electrodes and situated on opposite sides of and in counter electrode to said counter electrode to said water vapor and comprised of an electron conductive material, and being separate from said sensing and counter electrode having a surface of said second protonic conductive electrolyte membrane, said means for exposing a surface of said counter electrode to said water vapor exposing a surface of said second protonic conductive electrolyte membrane, said first and second protonic electrode having in electrical connection therebetween said means for applying a DC power across said second protonic electrolyte membrane; whereby the gas is transported away from the counter electrode when the DC power means applies a DC power to the first and second pump electrodes having in electrical connection therebetween said means for applying a DC power across said second protonic electrolyte membrane, and also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electroly characteristic between the sensing electrode and the cou
		Unlike original patent claim 24, presented reissue claim 71 does not recite the language "quantitative measurement," and also does not recite the language "wherein the second protonic conductive electrolyte membrane is substantially composed of a solid, perfluorinated, ion-exchange polymer."

Differences in Claim Language	Unlike original patent claim 25, presented reissue claim 71 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane, and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."  Unlike original patent claim 25, presented reissue claim 71 does not recite the language "quantitative measurement," and also does not recite the language "wherein the second protonic conductive electrolyte membrane is a hydrated metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 26, presented reissue claim 71 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane, and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."  Unlike original patent claim 26, presented reissue claim 71 does not recite the language "wherein the surface area of the surface of said first pump electrode that is exposed to the ambient atmosphere is smaller than the surface area of the surface of the second protonic conductive electrolyte membrane is exposed to said water vapor, whereby the second protonic conductive electrolyte membrane is exposed to substantially 100 percent relative humidity, and a positive pressure of said water vapor exists from the surface of said second pump electrode that is exposed to said water vapor to the surface of said first pump electrode that is exposed to the ambient atmosphere."
Presented Reissue Claim	71	71
Original Patent Claim	25	26

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
27	71	Unlike original patent claim 27, presented reissue claim 71 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane, and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 27, presented reissue claim 71 does not recite the language "quantitative measurement," and also doe snot recite the language "wherein the surface area of the surface of the second pump electrode that is exposed to said water vapor is separated from said means for exposing a surface of said counter electrode to said water vapor by a hydrophobic membrane permeable to water vapor and substantially impervious to water."
28	71	Unlike original patent claim 28, presented reissue claim 71 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane, and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 28, presented reissue claim 71 does not recite the language "quantitative measurement," and also does not recite the language "further comprising: means for applying a DC pulse power source across the first protonic conductive membrane, said sensing and counter electrodes having in electrical connection therebetween said means for alternating the connection between the sensing and counter electrodes from the electrical measurement means to the DC pulse power means; whereby, in a positive ambient atmosphere concentration of said gas, said electrical measurement means detects changes in said electrical characteristic when said switch means connects said electrical measurement means to the sensing and counter electrodes; and whereby said DC pulse power means moves the gas away from a side of the gas sensor where the counter electrode is placed when said switch means connects said DC pulse power means to the sensing and counter electrodes."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
		Unlike original patent claim 29, presented reissue claim 71 recites the language "an
56	7.1	electrochemical gas sensor for sensing a gas in an ambient atmosphere," also recites the
		language "the sensing electrode and the counter electrode being on opposite sides of the first
		protonic conductive electrolyte membrane, and also recites the language "the sensing
		electrode reacts with the gas to produce a change in electrical characteristic between the
		sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode."
		Unlike original patent claim 29, presented reissue claim 71 does not recite the language
		"quantitative measurement," and also does not recite the language "wherein the gas is CO."
		Unlike original patent claim 30, presented reissue claim 71 recites the language "an
30	71	electrochemical gas sensor for sensing a gas in an ambient atmosphere," also recites the
		language "the sensing electrode and the counter electrode being on opposite sides of the first
		protonic conductive electrolyte membrane, and also recites the language "the sensing
		electrode reacts with the gas to produce a change in electrical characteristic between the
		sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode."
		Unlike original patent claim 30, presented reissue claim 71 does not recite the language
		"quantitative measurement," and also does not recite the language "wherein the gas is NOx."

Presented Differences in Claim Language Reissue Claim	Unlike original patent claim 31, presented reissue claim 71 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane, and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."  Unlike original patent claim 31, presented reissue claim 71 does not recite the language	"quantitative measurement," and also does not recite the language "wherein the gas is hydrogen."  Unlike original patent claim 32, presented reissue claim 71 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane, and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."  Unlike original patent claim 32, presented reissue claim 71 does not recite the language "quantitative measurement," and also does not recite the language "wherein the gas is H ₂ S."
Original Patent Claim	31	32

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
		Unlike original patent claim 33, presented reissue claim 71 recites the language "an
33	71	electrochemical gas sensor for sensing a gas in an ambient atmosphere," also recites the
		language "the sensing electrode and the counter electrode being on opposite sides of the first
		protonic conductive electrolyte membrane, and also recites the language "the sensing
		electrode reacts with the gas to produce a change in electrical characteristic between the
		sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode."
		Unlike original patent claim 33, presented reissue claim 71 does not recite the language
		"quantitative measurement," and also does not recite the language "wherein the gas is H ₂ O
		vapor."
		Unlike original patent claim 34, presented reissue claim 71 recites the language "an
34	71	electrochemical gas sensor for sensing a gas in an ambient atmosphere," also recites the
		language "the sensing electrode and the counter electrode being on opposite sides of the first
		protonic conductive electrolyte membrane, and also recites the language "the sensing
		electrode reacts with the gas to produce a change in electrical characteristic between the
		sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode."
		Unlike original patent claim 34, presented reissue claim 71 does not recite the language
		"quantitative measurement," and also does not recite the language "wherein the gas is
		متحدد بشارين

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
35	71	connice original patent ciaim 33, presented reissue ciaim 71 recites the language an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the
		counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between
		the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode,"
		material and 50-90 wt % of a first and a second electrical conductor material."
		measurement," does not recite the language "a second protonic conductive electrolyte membrane permeable
		to water vapor;" does not recite the language "and said first pump electrode having a surface exposed to the
		amotein aunospitele, said second punip electrode to said water vanor, and said counter electrode having a
		surface exposed to said water vapor by said means for exposing a surface of said second pump electrode to
		said water vapor," and also does not recite the language "means for applying a DC power across said second
		protonic electrolyte membrane in electrical contact with said first and second pump electrodes; whereby the
		gas is transported away from the counter electrode when the DC power means applies a DC power across
		said second protonic electrolyte membrane."
		Unlike original patent claim 36, presented reissue claim 71 recites the language "an electrochemical gas
36	71	sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the
		counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the
		language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between
		the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode,"
		and also recites the language "wherein the electrical conducting material of at least one of said sensing and
		counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor
	<del>-</del>	material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 36, presented reissue claim 71 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein at least one of said first and second protonic
		conductive electrolyte membranes is substantially comprised of a solid, perfluorinated, ion-exchange nolymer."

electrode and the counter electrode in the absen recites the language "wherein the electrical cone electrodes is a proton-electron mixed conductive and 50-90 wt % of a first and a second electrical confuctive electrolyte membranes is a hydrated measurement," and also does not recite the lang conductive electrolyte membranes is a hydrated measurement, and also does not recite the lang conductive electrolyte membranes is a hydrated monitive original patent claim 38, presented reissue for sensing a gas in an ambient atmosphere? relectrode being on opposite sides of the first protective sensing electrode reacts with the gas to procelectrode and the counter electrode in the absentectives the language "wherein the electrical confectores the language "wherein the electrical confectores is a proton-electron mixed conductive and 50-90 wt % of a first and a second electrical confectored to 4 first and a second electrical confectored that is exposed to said water vapor, we exposed to the ambient atmosphere has a surface electrode that is exposed to said water vapor, we exposed to substantially 100 percent relative hum surface of said counter electrode that is exposed to the ambient atmosphere, the secons is exposed to the ambient atmosphere.	Unlike original patent claim 37, presented reissue claim 71 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing
71	electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."  Unlike original patent claim 37, presented reissue claim 71 does not recite the language "quantitative measurement," and also does not recite the language "wherein at least one of the first and second protonic conductive electrolyte membranes is a hydrated metal oxide protonic conductor electrolyte membranes."
Unlike original patent claim 38, presented rei measurement," and also does not recite the lange exposed to the ambient atmosphere has a surface pump electrode that is exposed to said water var electrode that is exposed to said water vapor, we exposed to substantially 100 percent relative hun surface of said counter electrode that is exposed to is exposed to the ambient atmosphere, the seconic exposed to the ambient atmosphere, the seconic electrode that is exposed to the ambient atmosphere.	Unlike original patent claim 38, presented reissue claim 71 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material
exposed to the ambient atmosphere has a surface electrode that is exposed to said water vapor, we exposed to substantially 100 percent relative hun surface of said counter electrode that is exposed to is exposed to the ambient atmosphere, the secons is exposed to the ambient atmosphere.	and 50-90 wt % of a first and a second electrical conductor material."  Unlike original patent claim 38, presented reissue claim 71 does not recite the language "quantitative measurement," and also does not recite the language "wherein the surface of said first pump electrode that is exposed to the ambient atmosphere has a surface area smaller than the surface area of the surface of the second pump electrode that is exposed to said water vapor, and wherein the surface of said sensing electrode that is
substantially 100 percent relative humidity, and a of said second pump electrode that is exposed to	exposed to the ambient atmosphere has a surface area smaller than the surface area of the surface of the counter electrode that is exposed to said water vapor, whereby the first protonic conductive electrolyte membrane is exposed to substantially 100 percent relative humidity, a positive pressure of said water vapor exists from the surface of said counter electrode that is exposed to said water vapor to the surface of said sensing electrode that is exposed to said water vapor to the surface of said sensing electrode that is exposed to substantially 100 percent relative humidity, and a positive pressure of said water vapor exists from the surface of said second pump electrode that is exposed to said water vapor to the surface of said first pump electrode

Original	Presented	Differences in Claim Language
Patent Claim	Keissue Claim	
30	17	Unlike original patent claim 39, presented reissue claim 71 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the
<u> </u>	1/	
		language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between
		the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode,"
		counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor
		material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 39, presented reissue claim 71 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the surface area of each of the surfaces of the
		second pump and counter electrodes that are exposed to said water vapor by said means for exposing a
		surface of said second pump electrode to said water vapor are each separated from said means for exposing a
		vapor and substantially impervious to water."
40	71	sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the
		counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the
		language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between
		the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode,"
		and also recites the language "wherein the electrical conducting material of at least one of said sensing and
		counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor
		material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 40, presented reissue claim 71 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein said means for exposing a surface of said
		second pump electrode to said water vapor further contains an antifreeze additive.

Original Patent Claim	Presented Reissue Claim	Differences in Claim Language
41	71	
		and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an
		applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed
		a second electrical conductor material."
		Unlike original patent claim 41, presented reissue claim 71 does not recite the language "und also does not recite the language "wherein at least one of the
		surfaces of said first protonic conductive electrolyte membrane in contact with one of the sensing and counter electrodes is substantially nonplanar, and wherein at least one of the surfaces of said
		second protonic conductive electrolyte membrane in contact with one of the first and second pump electrodes is substantially nonplanar."
		Unlike original patent claim 42, presented reissue claim 71 recites the language "an electrochemical
42	71	gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte
	-	membrane," recites the language "the sensing electrode reacts with the gas to produce a change in
		electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical
		a second electrical conductor material."
		Unlike original patent claim 42, presented reissue claim 71 does not recite the language
		sensing, counter, first pump, and second pump electrodes is comprised of film having a thickness in the range of about 50 Angstroms to 10,000 Angstroms."

Original 43 44	Presented Reissue Claim 71	Differences in Claim Language  Unlike original patent claim 43, presented reissue claim 71 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrody membrane," recites the language "the sensing electrode reacts with the gas to produce a change in applied characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conductive material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."  Unlike original patent claim 43, presented reissue claim 71 does not recite the language "wherein the film is substantially composed of a noble metal."  Unlike original patent claim 44, presented reissue claim 71 recites the language "the sensing electrode and the counter electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode in the absence of an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductive material sensing electrode."
		Unlike original patent claim 44, presented reissue claim 71 does not recite the language "quantitative measurement," and also does not recite the language "wherein the noble metal is platinum."

kd Differences in Claim Language aim	Unlike original patent claim 45, presented reissue claim 71 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 45, presented reissue claim 71 does not recite the language "quantitative measurement," and also does not recite the language "wherein the at least one of the sensing, counter, first pump, and second pump electrodes is substantially comprised of proton conductive material."	Unlike original patent claim 46, presented reissue claim 71 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 46, presented reissue claim 71 does not recite the language "quantitative measurement," and also does not recite the language "wherein at least one of the first and second protonic conductive electrolyte membranes is substantially comprised of a solid,
Presented Reissue Claim	71		71	
Original Patent Claim	45		46	

Differences in Claim Language	Unlike original patent claim 47, presented reissue claim 71 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 47, presented reissue claim 71 does not recite the language "quantitative measurement," and also does not recite the language "wherein at least one of the first and second protonic conductive electrolyte membranes is a hydrated metal oxide protonic conductive electrolyte membrane."  Unlike original patent claim 48, presented reissue claim 71 recites the language "the sensing electrode gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode and the counter electrode in the absence of an electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conductive material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 48, presented reissue claim 71 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrical conducting material of at least one of said sensing, counter, first pump, and second pump electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
Presented Reissue Claim	71	71	
Original Patent Claim	47	48	

Differences in Claim Language	Unlike original patent claim 49, presented reissue claim 71 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 49, presented reissue claim 71 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for said at least one of the sensing, counter, first pump, and second pump electrodes is a copolymer having a tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 50, presented reissue claim 71 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 50, presented reissue claim 71 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing, counter, first pump, and second pump electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing, counter, first pump and second pump electrodes is about 1-50 wt % of platinum."
Presented Reissue Claim	71		71	
Original Patent Claim	49		50	

nted Differences in Claim Language	Claim	Unlike original patent claim 51, presented reissue claim 71 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a protonelectron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first	and a second electrical conductor material."  Unlike original patent claim 51, presented reissue claim 71 does not recite the language "quantitative measurement" and also does not recite the language "wherein one of the first and second electrical conductor	materials for said at least one of the sensing, counter, first pump, and second pump electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing counter first nume, and second nume electrodes is about 1.50 at % of Ru oxide."		measurement," and does not recite the language "a reference electrode permeable to water vapor and comprised of an electrical conducting material; a counter electrode permeable to water vapor and comprised of an electrical conducting material and being separate from both said sensing and reference electrodes, and being exposed to the ambient atmosphere; a protonic conductive electrolyte membrane permeable to water vapor, having top and bottom sides, said bottom side of said protonic conductive membrane being in contact with the counter electrode, and the top side of said protonic conductive membrane being in contact with the sensing and reference electrodes;" and also does not recite the language "wherein the electrical conducting material of at least one of
Presented	Reissue Claim	71			71	
Original	Patent Claim	51			52	

Differences in Claim Language	Unlike original patent claim 53, presented reissue claim 71 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the first protonic conductive electrolyte membrane," recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 53, presented reissue claim 71 does not recite the language "quantitative measurement," and also does not recite the language "further comprising: means for applying a DC power across said protonic electrolyte membrane in electrical contact between the sensing electrode and said counter electrode, whereby the gas is transported away from the counter electrode when the DC power across said protonic electrolyte membrane."  Unlike original patent claim 54, presented reissue claim 71 recites the language "an electrochemical gas	sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode and the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."  Unlike original patent claim 54, presented reissue claim 71 does not recite the language "quantitative measurement," and also does not recite the language "wherein said means for exposing a surface of said counter electrode to said water vapor further contains an antifreeze additive."
Presented Reissue Claim	71		71
Original Patent Claim	53		54

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
55	71	Unlike original patent claim 55, presented reissue claim 71 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode
		being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the
		counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-
		4)
		and a second electrical conductor material.
		Unlike original patent claim 55, presented reissue claim 71 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the surface of said sensing electrode that is
		exposed to the ambient atmosphere has a surface area smaller than the surface area of the surface of the counter
		exposed to substantially 100 percent relative humidity, and a positive pressure of said water vapor exists from the
		surface of said counter electrode that is exposed to said water vapor to the surface of said sensing electrode that is
		exposed to the ambient atmosphere."
		Unlike original patent claim 56, presented reissue claim 71 recites the language "an electrochemical gas sensor
99	71	for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode
		being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing
		electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the
		counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language
		"wherein the electrical conducting material of al least one of said sensing and counter electrodes is a proton-
		and a second ejectifical commetor material.
	·····	Unlike original patent claim 56, presented reissue claim 71 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein at least one of the surfaces of said protonic
		conductive electrolyte membrane in contact with one of the sensing, counter, and reference electrodes is substantially nonplanar."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
65	71	Unlike original patent claim 59, presented reissue claim 71 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the
		counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites
		the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic
		. 4
		•,
		wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 59, presented reissue claim 71 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the film is substantially composed of a
		Unlike original patent claim 60, presented reissue claim 71 recites the language "an electrochemical gas
09	71	sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the
		counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites
		45
		between the sensing electrode and the counter electrode in the absence of an applied voltage to the
		one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50
		wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor
		material."
		Unlike original natent claim 60, presented reissue claim 71 does not recite the language "quantitative"
		measurement," and also does not recite the language "wherein the noble metal is platinum."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
		Unlike original patent claim 61, presented reissue claim 71 recites the language "an electrochemical gas
61	71	sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the
		counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic
		between the sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode," and also recites the language "wherein the electrical conducting material of at least
		wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 61, presented reissue claim 71 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the protonic conductive electrolyte
		membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
5		Unlike original patent claim 62, presented reissue claim 71 recites the language "an electrochemical gas
70	1/	sensor for sensing a gas in an annotative actives the farst protonic conductive electrolyte membrane," recites
		the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic
		between the sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode," and also recites the language "wherein the electrical conducting material of at least
		one of said sensing and conflicter electrodes is a proton-electron mixed conductive material and \$0.00 at % of a first and a second electrical conductor
-		
		matchai.
		Unlike original patent claim 62, presented reissue claim 71 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is a hydrated metal oxide protonic conductor electrolyte membrane."
		The second secon

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
63	71	Unlike original patent claim 63, presented reissue claim 71 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the
		counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic
		between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least
	,	one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor
		Unlike original patent claim 63, presented reissue claim 71 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the proton conductor material for said at
		backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group
		or a carboxylic acid group."
79	71	Unlike original patent claim 64, presented reissue claim 71 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the
		counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites
		the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic
		between the sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode, and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material baying 10-50
		Unlike original patent claim 64, presented reissue claim 71 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein one of the first and second electrical
	-	conductor materials for said at least one of the sensing, counter, and reference electrodes is about 20-39
		wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing counter, and reference electrodes is about 1-50 wt % of platinum."

Presented  Original Reissue Claim  Unlike original patent claim 65, presented reissue claim 71 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor materials for said at least one of the sensing, counter, and reference electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing, counter, and reference electrodes is about 1-50 wt % of Ru oxide."					 				
			counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic	between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least	-	Unlike original patent claim 65, presented reissue claim 71 does not recite the language "quantitative measurement" and also does not recite the language "wherein one of the first and second electrical	conductor materials for said at least one of the sensing, counter, and reference electrodes is about 50-99	wt % of carbon black, and the other of the first and second electrical conductor materials for said at least	one of the sensing, counter, and reference electrodes is about 1-50 wt % of Ru oxide."
Original Patent Claim 65	Presented Peisone Claim	71							
	Original Patent Claim	65							

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
		Unlike original patent claim 1, presented reissue claim 72 recites the language "an
	72	electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language
		"the sensing electrode and the counter electrode being on opposite sides of the first protonic
		conductive electrolyte membrane," recites the language "the sensing electrode and the
		counter electrode are the only two electrodes in contact with the first protonic conductive
-		electrolyte membrane," and also recites the language the sensing electrode reacts with the
		gas to produce a change in electrical characteristic between the sensing electrode and the
		counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claims 1, presented reissue claim 72 does not recite the language
_		"quantitative measurement."
		Unlike original patent claim 2, presented reissue claim 72 recites the language "an
2	72	electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language
		"the sensing electrode and the counter electrode being on opposite sides of the first protonic
_		conductive electrolyte membrane," recites the language "the sensing electrode and the
		counter electrode are the only two electrodes in contact with the first protonic conductive
		electrolyte membrane," and also recites the language the sensing electrode reacts with the
		gas to produce a change in electrical characteristic between the sensing electrode and the
		counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 2, presented reissue claim 72 does not recite the language
		"quantitative measurement," or the language "wherein said water vapor containing means
		contains a volume of water and an antificeze additive.

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
3	72	Unlike original patent claim 3, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode
		and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode and the counter electrode are the only two
		electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the
		language the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode."
		Unlike original patent claim 3, presented reissue claim 72 does not recite the language "quantitative
		measurement," and does not recite the language "wherein the surface of said sensing electrode that is
		exposed to the ambient atmosphere has a surface area that is smaller than the surface area of the
		conductive electrolyte membrane is exposed to substantially 100 percent relative humidity, and a
		positive pressure of said water vapor exists from the surface of said counter electrode exposed to said
		water vapor to the surface of said sensing electrode exposed to the ambient atmosphere."
		Unlike original patent claim 4, presented reissue claim 72 recites the language "an electrochemical
4	72	gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode
		and the counter electrode being on opposite sides of the first protonic conductive electrolyte
		membrane, recites the language "the sensing electrode and the counter electrode are the only two
		Januage the sensing electrode reacts with the gas to produce a change in electrical characteristic
		between the sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode."
		Unlike original patent claim 4. presented reissue claim 72 does not recite the laneuage "quantitative
		measurement," and does not recite the language "wherein the surface area of the surface of the
		counter electrode that is exposed to said water vapor is separated from said means for exposing a
		surface of said counter electrode to said water vapor by a hydrophobic membrane permeable to water
		vapor and substantially impervious to water."

Differences in Claim Language	Unlike original patent claim 5, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 5, presented reissue claim 72 does not recite the language "quantitative measurement," and does not recite the language "wherein the first protonic conductive electrolyte membrane has opposing surfaces, each of said opposing surfaces being in contact with one of the sensing and counter electrodes, wherein at least one of the opposing surfaces of said first protonic conductive electrolyte membrane in contact with one of the sensing and counter electrodes is substantially nonplanar."	Unlike original patent claim 6, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 6, presented reissue claim 72 does not recite the language "quantitative measurement," and does not recite the language "wherein at least one of the sensing and counter electrodes is comprised of film having a thickness in the range of about 50 Angstroms to 10,000 Angstroms."
Presented Reissue Claim	72		72	
Original Patent Claim	5		9	

Differences in Claim Language	Unlike original patent claim 7, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."  Unlike original patent claim 7, presented reissue claim 72 does not recite the language "wherein the film is substantially composed of a noble metal."	Unlike original patent claim 8, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."  Unlike original patent claim 8, presented reissue claim 72 does not recite the language "quantitative measurement," and does not recite the language "wherein the noble metal is platinum."
Presented Reissue Claim	72	72
Original Patent Claim	7	∞

Presented Differences in Claim Language Reissue Claim	Unlike original patent claim 9, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrody are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 9, presented reissue claim 72 does not recite the language "quantitative measurement," and does not recite the language "wherein the first protonic conductive electrolyte membrane is substantially composed of a solid, perfluorinated, ion-exchange polymer."	Unlike original patent claim 10, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 10, presented reissue claim 72 does not recite the language "quantitative measurement," and does not recite the language "wherein the first protonic conductive electrolyte membrane is a hydrated metal oxide protonic conductor electrolyte membrane."
Original Patent Claim R	6		10	

Original Patent Claim	Presented Reissue Claim	Differences in Claim Language
11	72	Unlike original patent claim 11, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language
		"the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive
		electrolyte membrane," and also recites the language the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the
		counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 11, presented reissue claim 72 does not recite the language "unlessurement" and also does not recite the language "wherein the proton
		conductor material for said at least one of the sensing and counter electrodes is a copolymer
		having a tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
		Unlike original patent claim 12, presented reissue claim 72 recites the language "an
12	72	electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language
		"the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane" recites the language "the sensing electrode and the
		counter electrode are the only two electrodes in contact with the first protonic conductive
		electrolyte membrane," and also recites the language the sensing electrode reacts with the
		gas to produce a change in electrical characteristic between the sensing electrode and the
		counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 12, presented reissue claim 72 does not recite the language
		"quantitative measurement," and also does not recite the language "wherein one of the first
	·	and second electrical conductor materials for said at least one of the sensing and counter
		electrodes is about 50-99 wt % of carbon black, and the other of the first and second
		electrical conductor materials for said at least one of the sensing and counter electrodes is
		about 1-30 Wt 70 of prantium.

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
13	72	Unlike original patent claim 13, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 13, presented reissue claim 72 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing and counter electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing and counter electrodes is about 1-50 wt % of Ru oxide."
14	72	Unlike original patent claim 14, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 14, presented reissue claim 72 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor further comprises: first and second pump electrodes comprised of an electrical conducting material permeable to water vapor, separate from said sensing and counter electrodes, and situated on opposite sides of and in contact with said first protonic conductive membrane, said second pump electrode being situated on the same side of said first protonic conductive membrane as the counter electrode and having a surface thereon exposed to the water vapor in said means for exposing a surface of said counter electrode to said water vapor; and means for applying a DC power across the first protonic conductive electrolyte membrane, said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across the first protonic conductive electrolyte membrane; whereby the gas is transported away from the counter electrode protonic conductive electrolyte membrane; whereby the gas is transported away from the counter electrode
		when the DC power means applies a DC power to the first and second pump electrodes."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
15	7.7	Unlike original patent claim 15, presented reissue claim 72 recites the language "an
C	7	"the sensing electrode and the counter electrode being on opposite sides of the first protonic
		conductive electrolyte membrane," recites the language "the sensing electrode and the
		counter electrode are the only two electrodes in contact with the first protonic conductive
		electrolyte membrane," and also recites the language the sensing electrode reacts with the
		gas to produce a change in electrical characteristic between the sensing electrode and the
		counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 15, presented reissue claim 72 does not recite the language
		"quantitative measurement," and also does not recite the language "wherein the electrical
		conducting material of the first and second pump electrodes is substantially composed of carbon "
		Unlike original patent claim 16, presented reissue claim 72 recites the language "an
16	72	electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language
		"the sensing electrode and the counter electrode being on opposite sides of the first protonic
		conductive electrolyte membrane," recites the language "the sensing electrode and the
		counter electrode are the only two electrodes in contact with the first protonic conductive
		electrolyte membrane," and also recites the language the sensing electrode reacts with the
		gas to produce a change in electrical characteristic between the sensing electrode and the
		counter electrode in the absence of an applied voltage to the sensing electrode."
		11-111
		Chilke Original patent ciaim 10, presented reissuc ciaim 7z does not recite the language. "quantitative measurement." and also does not recite the language "wherein the electrical
		conducting material of the first and second pump electrodes is substantially composed of
		noble metals."

Original	Presented	Differences in Claim Language
Patent Claim	Keissue Claim	
17	72	Unlike original patent claim 17, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language
	<u> </u>	"the sensing electrode and the counter electrode being on opposite sides of the first protonic
		conductive electrolyte membrane," recites the language "the sensing electrode and the
		counter electrode are the only two electrodes in contact with the first protonic conductive
		electrolyte membrane," and also recites the language the sensing electrode reacts with the
		gas to produce a change in electrical characteristic between the sensing electrode and the
		counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 17, presented reissue claim 72 does not recite the language
		"quantitative measurement," and also does not recite the language "wherein the electrical
		conducting material of the first and second pump electrodes is substantially composed of
		conductive hydrated metal oxides."
		Unlike original patent claim 18, presented reissue claim 72 recites the language "an
18	72	electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language
		"the sensing electrode and the counter electrode being on opposite sides of the first protonic
		conductive electrolyte membrane," recites the language "the sensing electrode and the
		counter electrode are the only two electrodes in contact with the first protonic conductive
		electrolyte membrane," and also recites the language the sensing electrode reacts with the
		gas to produce a change in electrical characteristic between the sensing electrode and the
		counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 18, presented reissue claim 72 does not recite the language
		"quantitative measurement," and also does not recite the language "wherein at least one of
		the first and second pump electrodes is comprised of a film having a thickness in the range
		of about 50 Angstroms to 10,000 Angstroms.

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
61	72	Unlike original patent claim 19, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language
		"the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode and the
		counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language the sensing electrode reacts with the
		gas to produce a change in electrical characteristic between the sensing electrode and the
	·	counter electrone in the absence of an applica voltage to the sensing electrone.
		Unlike original patent claim 19, presented reissue claim 72 does not recite the language
		"quantitative measurement," and also does not recite the language "wherein the electrical
		conducting material of said first and second pump electrodes is a proton-electron mixed
		conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 20, presented reissue claim 72 recites the language "an
20	72	electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language
		"the sensing electrode and the counter electrode being on opposite sides of the first protonic
		conductive electrolyte membrane," recites the language "the sensing electrode and the
		counter electrode are the only two electrodes in contact with the first protonic conductive
		electrolyte membrane," and also recites the language the sensing electrode reacts with the
		gas to produce a change in electrical characteristic between the sensing electrode and the
		counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 20, presented reissue claim 72 does not recite the language
	•—	"quantitative measurement," and also does not recite the language "wherein the proton
		conductor material for both the first and second pump electrodes is a copolymer having a
		tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing at
		least one of a sulfonic acid group or a carboxylic acid group."

Original Dotont Cloim	Presented Deigner	Differences in Claim Language
I atclit Ciailli	NCISSUC CIGIIII	Unlike orioinal natent claim 21 presented reissue claim 72 recites the language "an
21	72	
		"the sensing electrode and the counter electrode being on opposite sides of the first protonic
		conductive electrolyte membrane," recites the language "the sensing electrode and the
		counter electrode are the only two electrodes in contact with the first protonic conductive
		electrolyte membrane," and also recites the language the sensing electrode reacts with the
		gas to produce a change in electrical characteristic between the sensing electrode and the
		counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 21, presented reissue claim 72 does not recite the language
		"quantitative measurement," and also does not recite the language "wherein one of the first
		and second electrical conductor materials for the first pump electrode is about 50-99 wt % of
		carbon black, and the other of the first and second electrical conductor materials for the first
		pump electrode is 1 to 50 wt % of platinum."
		Unlike original patent claim 22, presented reissue claim 72 recites the language "an
22	72	electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language
		"the sensing electrode and the counter electrode being on opposite sides of the first protonic
		conductive electrolyte membrane," recites the language "the sensing electrode and the
		counter electrode are the only two electrodes in contact with the first protonic conductive
		electrolyte membrane," and also recites the language the sensing electrode reacts with the
		gas to produce a change in electrical characteristic between the sensing electrode and the
		counter electrode in the absence of an applied voltage to the sensing electrode."
		Tatilis saiding and of mission property and animal animal of mission and anits and the landing
		"minke original patent ciain 22, presented reissue ciain 72 upes not regire up ranguage."
		qualificative incurationing, and areas not received in mineral control of the second miner electrode is shout \$0.00 art 9%
		and second electrical conductor materials for the second plunip electrode is about 50-55 wt 70
		of carbon black, and the other of the first and second electrical conductor materials for the
		second pump electrode is 1 to 50 Wt % of Ku oxide.

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
23	72	Unlike original patent claim 23, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 23, presented reissue claim 72 does not recite the language "wherein the electrochemical gas sensor further comprises: a second protonic conductive electrolyte membrane permeable to water vapor; first and second pump electrodes permeable to water vapor and comprised of an electron conductive material, and being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane, said means for exposing a surface of said counter electrode to said water vapor and said first pump electrode having a surface of said second pump electrode to said water vapor, and said first pump electrode having a surface exposed to the ambient atmosphere; and means for applying a DC power across said second protonic electrolyte membrane, said first and second protonic electrolyte membrane; whereby the gas is transported away from the counter electrode when the DC power means applies a DC power to the first and second pump electrodes."
24	72	Unlike original patent claim 24, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."  Unlike original patent claim 24, presented reissue claim 72 does not recite the language "quantitative measurement," and also does not recite the language "wherein the second protonic conductive electrolyte membrane is substantially composed of a solid, perfluorinated, ion-exchange polymer."

Presented Differences in Claim Language	Unlike original patent claim 25, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."  Unlike original patent claim 25, presented reissue claim 72 does not recite the language "quantitative"	electrolyte membrane is a hydrated metal oxide protonic conductor electrolyte membrane."  Unlike original patent claim 26, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."  Unlike original patent claim 26, presented reissue claim 72 does not recite the language "quantitative measurement," and also does not recite the language "wherein the surface area of the surface area of the surface of the second pump electrode that is exposed to said water vapor, whereby the second protonic conductive electrolyte membrane is exposed to substantially 100 percent relative humidity, and a positive pressure of said water vapor exists from the surface of said second pump electrode that
Pre	X GG	
Original	25	26

Original	Dresented	Differences in Claim Language
Patent Claim	Reissue Claim	
		Unlike original patent claim 27, presented reissue claim 72 recites the language "an electrochemical
27	72	gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode
	-	and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode and the counter electrode are the only two
		electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the
		language the sensing electrode reacts with the gas to produce a change in electrical characteristic
		between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 27, presented reissue claim 72 does not recite the language "quantitative
		measurement," and also doe snot recite the language "wherein the surface area of the surface of the
		second pump electrode that is exposed to said water vapor is separated from said means for exposing
		a surface of said counter electrode to said water vapor by a hydrophobic membrane permeable to
		water vapor and substantially impervious to water."
		Unlike original patent claim 28, presented reissue claim 72 recites the language "an electrochemical
28	72	gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode
		and the counter electrode being on opposite sides of the first protonic conductive electrolyte
		membrane," recites the language "the sensing electrode and the counter electrode are the only two
		electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the
		language the sensing electrode reacts with the gas to produce a change in electrical characteristic
		between the sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode."
		Unlike original patent claim 28, presented reissue claim 72 does not recite the language "quantitative
		measurement," and also does not recite the language "further comprising: means for applying a DC
		pulse power source across the first protonic conductive membrane, said sensing and counter
		electrodes having in electrical connection therebetween said means for applying DC pulse power
		across the first protonic conductive membrane; and switch means for alternating the connection
		power means; whereby, in a positive ambient atmosphere concentration of said gas, said electrical
		measurement means detects changes in said electrical characteristic when said switch means connects
		said electrical measurement means to the sensing and counter electrodes; and whereby said DC pulse
		power means moves the gas away from a side of the gas sensor where the counter electrode is placed when said emitch means connected and DC miles account to the sensing and counter electrodes."
		WHELL SAIL SWITCH INCALS CONTINUED FOR PLANT INCALS TO THE SCIENTIFY AND CONTINUE SECTIONS.

Differences in Claim Language	Unlike original patent claim 29, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 29, presented reissue claim 72 does not recite the language "quantitative measurement," and also does not recite the language "wherein the gas is CO."	Unlike original patent claim 30, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."  Unlike original patent claim 30, presented reissue claim 72 does not recite the language "wherein the gas is NO _x ."
Presented Reissue Claim	72		72
Original Patent Claim	29		30

Differences in Claim Language	Unlike original patent claim 31, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic	counter electrolyte membrane," recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 31, presented reissue claim 72 does not recite the language "quantitative measurement," and also does not recite the language "wherein the gas is hydrogen."	Unlike original patent claim 32, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."  Unlike original patent claim 32, presented reissue claim 72 does not recite the language "wherein the gas is H ₂ S."
Presented Reissue Claim	72			72
Original Patent Claim	31			32

Original Presented Differences in Claim Language Patent Claim Reissue Claim	Unlike original patent claim 33, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	"quantitative measurement," and also does not recite the language "wherein the gas is H ₂ O vapor."  Unlike original patent claim 34, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."  Unlike original patent claim 34, presented reissue claim 72 does not recite the language "wherein the gas is
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Original Patent Claim	Presented Reissue Claim	Differences in Claim Language
35	72	Unlike original patent claim 35, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language "the sensing electrode in contact with the first protonic conductive electrolyte membrane," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		does not recite the language "a second protonic conductive electrolyte membrane permeable to water vapor;" does not recite the language "and said first pump electrode having a surface exposed to the ambient atmosphere, said second pump electrode being separated from said counter electrode by said means for exposing a surface of said second pump electrode to said water vapor, and said counter electrode having a surface exposed to said water vapor by said means for exposing a surface of said second pump electrode to said water vapor," and also does not recite the language "means for applying a DC power across said second protonic electrolyte membrane in electrical contact with said first and second pump electrodes; whereby the gas is transported away from the counter electrode when the DC power means applies a DC power across said second protonic electrolyte membrane."
36	72	Unlike original patent claim 36, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductor material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."  Unlike original patent claim 36, presented reissue claim 72 does not recite the language "wherein at least one of said first and second protonic conductive electrolyte
		membranes is substantially comprised of a solid, perfluorinated, ion-exchange polymer."

Original Patent Claim	Presented Reissue Claim	Differences in Claim Language
37	72	Unlike original patent claim 37, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a protonelectron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 37, presented reissue claim 72 does not recite the language "quantitative measurement," and also does not recite the language "wherein at least one of the first and second protonic conductive electrolyte membranes is a hydrated metal oxide protonic conductor electrolyte membrane."
38	72	Unlike original patent claim 38, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language "the sensing electrode are the only two electrodes in contact with the first protonic conductive electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode racets with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material."  Unlike original patent claim 38, presented reissue claim 72 does not recite the language "wherein the surface area of the surface of said first pump electrode that is exposed to the ambient atmosphere has a surface area smaller than the surface area of the surface of the counter electrode that is exposed to said water vapor, whereby the first protonic conductive electrolyte membrane is exposed to substantially 100 percent relative humidity, a positive pressure of said sensing electrode that is exposed to said water vapor to the surface of said sensing electrode that is exposed to said water vapor sists from the surface of said counter electrode, the second protonic conductive electrolyte membrane is exposed to said sensing electrode that is exposed to said water vapor exists from the surface of said sensing electrode that is exposed to said water vapor sist from the surface of said sensing electrode that is exposed to said water vapor exist from the surface of said second pump electrode that is exposed to the ambient atmosphere."

Original	Presented	Differences in Claim Language
39	72	Unlike original patent claim 39, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the
		counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," also recites the language "the sensing electrode reacts with
		the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton.
		electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 39, presented reissue claim 72 does not recite the language "quantitative measurement," and also does not recite the language "wherein the surface area of each of the surfaces of the
		second pump and counter electrodes that are exposed to said water vapor by said means for exposing a surface of said second pump electrode to said water vapor are each separated from said means for exposing a
		surface of said second pump electrode to said water vapor by a hydrophobic membrane permeable to water vapor and substantially impervious to water."
40	77	
₽	1	counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites
		the language the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," also recites the language "the sensing electrode reacts with
		the gas to produce a change in electrical characteristic between the sensing electrode and the counter
		"wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-
		electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 40, presented reissue claim 72 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein said means for exposing a surface of said second numb electrode to said water vapor further contains an antifreeze additive."

Original Datent Claim	Presented Reissue Claim	Differences in Claim Language
I atcilt Claimi	ST CHAIR	Unlike original patent claim 41, presented reissue claim 72 recites the language "an electrochemical gas
4	7/	sensor for sensing a gas in an annotation authornical rectices the fanguage the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language the sensing electrode and the counter electrode are the only two electrodes in contact with the
		first protonic conductive electrolyte membrane," also recites the language "the sensing electrode reacts with
		electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-
		electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 41, presented reissue claim 72 does not recite the language "quantitative
		measurement, and also does not recite the language. Wherein at least one of the surfaces of said first protonic conductive electrolyte membrane in contact with one of the sensing and counter electrodes is
		·~ +
		Unlike original patent claim 42, presented reissue claim 72 recites the language "an electrochemical gas
42	72	sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the
		counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language the sensing electrode and the counter electrode are the only two electrodes in contact with the
		first protonic conductive electrolyte membrane," also recites the language "the sensing electrode reacts with
	,,,,,	the gas to produce a change in electrical characteristic between the sensing electrode and the counter
		"wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-
		electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a
		first and a second electrical conductor material."
		Unlike original patent claim 42, presented reissue claim 72 does not recite the language "quantitative measurement" and also does not recite the language "wherein at least one of the sensing counter first nump.
		and second pump electrodes is comprised of film having a thickness in the range of about 50 Angstroms to
		TO, VOV. 7 INESTRUMES.

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
43	72	Unlike original patent claim 43, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrody membrane," also recites the language the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a protonelectron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 43, presented reissue claim 72 does not recite the language "quantitative measurement," and also does not recite the language "wherein the film is substantially composed of a noble metal."
44	72	Unlike original patent claim 44, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language the sensing electrolyte membrane," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."  Unlike original patent claim 44, presented reissue claim 72 does not recite the language "quantitative measurement," and also does not recite the language "wherein the noble metal is platinum."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
45	72	sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the
		the language the sensing electrode and the counter electrode are the only two electrodes in contact with the
		first protonic conductive electrolyte membrane," also recites the language "the sensing electrode reacts with
		the gas to produce a change in electrical characteristic between the sensing electrode and the counter
		electrode in the absence of an applied voltage to the sensing electrode," and also recites the language
		"wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-
		electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a
		first and a second electrical conductor material.
		Unlike original patent claim 45, presented reissue claim 72 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the at least one of the sensing, counter, first
		pump, and second pump electrodes is substantially comprised of proton conductive material."
46	72	sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the
		counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites
		the language the sensing electrode and the counter electrode are the only two electrodes in contact with the
		first protonic conductive electrolyte membrane," also recites the language "the sensing electrode reacts with
		the gas to produce a change in electrical characteristic between the sensing electrode and the counter
		electrode in the absence of an applied voltage to the sensing electrode," and also recites the language
		"wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-
		electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a
		first and a second electrical conductor material."
		Unlike original patent claim 46, presented reissue claim /2 does not recite the language "quantitative"
		-
		conductive electrolyte membranes is substantially comprised of a solid, perfluorinated, ion-exchange
		polymer.

nted Differences in Claim Language Claim	Unlike original patent claim 47, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a protonelectron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."  Unlike original patent claim 47, presented reissue claim 72 does not recite the language "quantitative measurement," and also does not recite the language "wherein at least one of the first and second protonic conductive electrolyte membranes is a hydrated metal oxide protonic conductive electrolyte membranes."	Unlike original patent claim 48, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a protonelectron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."  Unlike original patent claim 48, presented reissue claim 72 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrical conducting material of at least one of said sensing, counter, first pump, and second pump electrodes is a proton-electron mixed conductive material having 10-50 wt % of a first and a second electrical conductor material and 50-90 wt % of a first and a second electrical conductive material and 50-90 wt % of a first and a second electrical conductor material and 50-90 wt % of a first and a second electrical conductive material and 50-90 wt % of a first and a second electrical conductor material and 50-90 wt % of a first and a second electrical conductor material and 50-90 wt % of a first and a second electrical conductor material and 50-90 wt % of a first and a second electrical conductor material and 50-90 wt % of a first and a second electrical conductor material and 50-90 wt % of a first and a second electrical conductor material and 50-90 wt
Presented Reissue Claim	72	72
Original Patent Claim	47	48

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
49	72	Unlike original patent claim 49, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the
	-	first protonic conductive electrolyte membrane," also recites the language "the sensing electrode reacts with
		the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language
		"wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-
		electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Thise original natent claim 49 presented reissue claim 72 does not recite the language "guantitative
		measurement," and also does not recite the language "wherein the proton conductor material for said at least
		one of the sensing, counter, first pump, and second pump electrodes is a copolymer having a
		tetrandoroetnyiene backoone with a side chain of perfuormated monomers containing at feast one of a sulfonic acid group or a carboxylic acid group."
		Unlike original patent claim 50, presented reissue claim 72 recites the language "an electrochemical gas
50	72	sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the
		counter electrone being our opposite sides of the following conductive electrolyte memorane, also recites
		the tanguage the sensing electrode and the counter electrode are the only two electrodes in confact with this protonic conductive electrolyte membrane," also recites the language "the sensing electrode reacts with
		the gas to produce a change in electrical characteristic between the sensing electrode and the counter
		"wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-
		first and a second electrical conductor material."
		Thlike original patent claim 50 presented reisule claim 72 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein one of the first and second electrical conductor
		materials for said at least one of the sensing, counter, first pump, and second pump electrodes is about 50-99
		of the sensing, counter, first pump and second pump electrodes is about 1-50 wt % of platinum."

Presented Reissue Claim	Unlike original patent claim 51, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language the sensing electrode and the counter electrodes in contact with the first protonic conductive electrolyte membrane," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a protonelectron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 51, presented reissue claim 72 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing, counter, first pump, and second pump electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing, counter, first pump, and second pump electrodes is about 1-50 wt % of Ru oxide."	Unlike original patent claim 52, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language the sensing electrode and the counter electrodes in contact with the first protonic conductive electrolyte membrane," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a protonelectrical conductor material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 52, presented reissue claim 72 does not recite the language "quantitative measurement," and does not recite the language "a reference electrode permeable to water vapor and comprised of an electrical conducting material; a counter electrode permeable to water vapor and comprised of an electrical conducting material and being separate from both said sensing and reference electrodes, and being exposed to the ambient atmosphere; a protonic conductive electrolyte membrane permeable to water vapor, having top and bottom sides, said bottom side of said protonic conductive membrane being in contact with the counter electrode, and the top side of said protonic conductive membrane being in
Patent Claim   K	51		52	

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
53	72	Unlike original patent claim 53, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language the
		sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an
		applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material
		having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 53, presented reissue claim 72 does not recite the language "quantitative
		measurement," and also does not recite the language "further comprising; means for applying a DC power across said protonic electrolyte membrane in electrical contact between the sensing electrode and said counter electrode,
j		whereby the gas is transported away from the counter electrode when the DC power means applies a DC power across said protonic electrolyte membrane."
		Unlike original patent claim 54, presented reissue claim 72 recites the language "an electrochemical gas sensor
54	72	for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode heing on opposite sides of the first protonic conductive electrolyte membrane" also recites the language the
		sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic
		conductive electrolyte membrane," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an
		applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting
		material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10.50 at % of a proton conductor material and 50.00 at % of a first and a second electrical conductor
		material."
		Unlike original patent claim 54, presented reissue claim 72 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein said means for exposing a surface of said counter electrode to said water vapor further contains an antifreeze additive."

Original Patent Claim	Presented Reisena Claim	Differences in Claim Language
55	72	Unlike original patent claim 55, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," also recites the language "the sensing electrode reacts with the gas to produce
		applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 55, presented reissue claim 72 does not recite the language "quantitative measurement," and also does not recite the language "wherein the surface of said sensing electrode that is exposed to the ambient atmosphere has a surface area smaller than the surface area of the surface of the counter electrode that is exposed to said water vapor, whereby the first protonic conductive electrolyte membrane is exposed to substantially 100 percent relative humidity, and a positive pressure of said water vapor exists from the surface of said counter electrode that is exposed to said water vapor to the surface of said sensing electrode that is exposed to the ambient atmosphere."
56	72	
		Unlike original patent claim 56, presented reissue claim 72 does not recite the language "quantitative measurement," and also does not recite the language "wherein at least one of the surfaces of said protonic conductive electrolyte membrane in contact with one of the sensing, counter, and reference electrodes is substantially nonplanar."

Original Patent Claim	Presented Reissue Claim	Differences in Claim Language
57	72	Unlike original patent claim 57, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 57, presented reissue claim 72 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing, counter, first pump, and second pump electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing, counter, first pump, and second pump electrodes is about 1-50 wt % of Ru oxide."
58	72	Unlike original patent claim 58, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode sensing electrodes in contact with the first protonic conductive electrody in contact with the first protonic conductive electrolyte membrane," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 58, presented reissue claim 72 does not recite the language "quantitative measurement," and also does not recite the language "wherein at least one of the sensing, counter, and reference electrodes is comprised of film having a thickness in the range of about 50 Angstroms to 10,000 Angstroms."

Original	Presented Daison Claim	Differences in Claim Language
59	72	Unlike original patent claim 59, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
		Unlike original patent claim 59, presented reissue claim 72 does not recite the language "quantitative measurement," and also does not recite the language "wherein the film is substantially composed of a noble metal."
09	72	Unlike original patent claim 60, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."  Unlike original patent claim 60, presented reissue claim 72 does not recite the language "quantitative measurement," and also does not recite the language "wherein the noble metal is platinum."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
61	72	Unlike original patent claim 61, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode
		being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic
		conductive electrolyte membrane," also recites the language "the sensing electrode reacts with the gas to produce
		a change in checking characteristic between the sensing electrode," and also recites the language "wherein the electrical conducting
		material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor
		Unlike original patent claim 61, presented reissue claim 72 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
		Unlike original patent claim 62, presented reissue claim 72 recites the language "an electrochemical gas sensor
62	72	for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode
		being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language the
		sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic
		a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an
		applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting
		having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor
		material."
		Unlike original patent claim 62, presented reissue claim 72 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is a hydrated metal oxide protonic conductor electrolyte membrane."
		hydracu meta oxide protine conductor executive memorane.

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
63	72	Unlike original patent claim 63, presented reissue claim 72 recites the language "an electrochemical gas sensor for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane" also recites the language the
		sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," also recites the language "the sensing electrode reacts with the gas to produce
		a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting
		material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor
		татепа!"
		Unlike original patent claim 63, presented reissue claim 72 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the proton conductor material for said at least one of the sensing, counter, and reference electrodes is a copolymer having a tetrafluoroethylene backbone with a side
		chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
		Unlike original patent claim 64, presented reissue claim 72 recites the language "an electrochemical gas sensor
49	72	for sensing a gas in an ambient atmosphere" recites the language "the sensing electrode and the counter electrode
		being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language the
		sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic
		conductive electrolyte membrane," also recites the language "the sensing electrode reacts with the gas to produce
		a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an annied waltage to the continuation electrical conducting
		material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material
		having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor
		Unlike original patent claim 64, presented reissue claim 72 does not recite the language "quantitative
		hatch and the other of the first and second electrical conductor materials for said at least one of the sensing.
		counter, and reference electrodes is about 1-50 wt % of platinum."

Differences in Claim Language		counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language "the sensing electrode and the counter electrode being on opposite sides of the first protonic conductive electrolyte membrane," also recites the language the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode," and also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."  Unlike original patent claim 65, presented reissue claim 72 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing, counter, and reference electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing, counter, and reference electrodes is about 1-50 wt % of Ru oxide."	
Presented	Reissue Claim	72	
Original	Patent Claim	9	

Original Patent Claim	Presented Peisone Claim	Differences in Claim Language
	73	Unlike original patent claim 1, presented reissue claim 73 recites the language "a non-biased electrochemical oas sensor for measurement of a oas in an ambient atmosphere," and also
•		recites the language "said electrical measurement means detects changes in said electrical
		characteristic in the absence of any biasing voltage."
		Unlike original patent claims 1, presented reissue claim 73 does not recite the language
	<u></u>	"quantitative measurement."
		Unlike original patent claim 2, presented reissue claim 73 recites the language "a non-biased
2	73	electrochemical gas sensor for measurement of a gas in an ambient atmosphere" and also
		recites the language "said electrical measurement means detects changes in said electrical
		characteristic in the absence of any biasing voltage."
		Unlike original patent claim 2, presented reissue claim 73 does not recite the language
	******	''quantitative measurement," or the language "wherein said water vapor containing means
		contains a volume of water and an antifreeze additive."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
3	73	Unlike original patent claim 3, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere" and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 3, presented reissue claim 73 does not recite the language "quantitative measurement," and does not recite the language "wherein the surface of said sensing electrode that is exposed to the ambient atmosphere has a surface area that is smaller than the surface area of the surface of the counter electrode that is exposed to said water vapor, whereby the first protonic conductive electrolyte membrane is exposed to substantially 100 percent relative humidity, and a positive pressure of said water vapor exists from the surface of said counter electrode exposed to said water vapor to the surface of said sensing electrode exposed to the ambient atmosphere."
4	73	Unlike original patent claim 4, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere" and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 4, presented reissue claim 73 does not recite the language "quantitative measurement," and does not recite the language "wherein the surface area of the surface of the counter electrode that is exposed to said water vapor is separated from said means for exposing a surface of said counter electrode to said water vapor by a hydrophobic membrane permeable to water vapor and substantially impervious to water."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
5	73	Unlike original patent claim 5, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere" and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 5, presented reissue claim 73 does not recite the language "quantitative measurement," and does not recite the language "wherein the first protonic conductive electrolyte membrane has opposing surfaces, each of said opposing surfaces being in contact with one of the sensing and counter electrolyte membrane in to of the opposing surfaces of said first protonic conductive electrolyte membrane in contact with one of the sensing and counter electrodes is substantially nonplanar."
9	73	Unlike original patent claim 6, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere" and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 6, presented reissue claim 73 does not recite the language "quantitative measurement," and does not recite the language "wherein at least one of the sensing and counter electrodes is comprised of film having a thickness in the range of about 50 Angstroms to 10,000 Angstroms."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
ľ	73	Unlike original patent claim 7, presented reissue claim 73 recites the language "a non-biased
•	C/	electrochemical gas sensor for measurement of a gas in an annotent aumosphere and also
		recites the language said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 7, presented reissue claim 73 does not recite the language "unpatituding magnification and does not recite the language "unbassing the film is
		چ
		Unlike original patent claim 8, presented reissue claim 73 recites the language "a non-biased
∞	73	electrochemical gas sensor for measurement of a gas in an ambient atmosphere" and also
		recites the language "said electrical measurement means detects changes in said electrical
		characteristic in the absence of any biasing voltage."
		Unlike original natent claim 8 presented reissue claim 73 does not recite the language
		"quantitative measurement," and does not recite the language "wherein the noble metal is
		platinum."

Differences in Claim Language		Unlike original patent claim 9, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere" and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 9, presented reissue claim 73 does not recite the language "quantitative measurement," and does not recite the language "wherein the first protonic conductive electrolyte membrane is substantially composed of a solid, perfluorinated, ion-exchange polymer."	Unlike original patent claim 10, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere" and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 10, presented reissue claim 73 does not recite the language "quantitative measurement," and does not recite the language "wherein the first protonic conductive electrolyte membrane is a hydrated metal oxide protonic conductor electrolyte membrane."
Presented	Reissue Claim	73		73	
Original	Patent Claim	6		10	

Original Presented  Patent Claim  Unlike original patent claim 11, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere" and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 11, presented reissue claim 73 does not recite the language "wherein the proton conductor material for said at least one of the sensing and counter electrodes is a copolymer having a tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 12, presented reissue claim 73 recites the language "a nonbiased electrochemical gas sensor for measurement of a gas in an ambient atmosphere" and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 12, presented reissue claim 73 does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing and counter electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing and counter electrodes is about 1-50 wt % of nlatinum."
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Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
13	73	Unlike original patent claim 13, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere" and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 13, presented reissue claim 73 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing and counter electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing and counter electrodes is about 1-50 wt % of Ru oxide."
14	73	Unlike original patent claim 14, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere" and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 14, presented reissue claim 73 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor further comprises: first and second pump electrodes comprised of an electrical conducting material permeable to water vapor, separate from said sensing and counter electrodes, and situated on opposite sides of and in contact with said first protonic conductive electrolyte membrane, said second pump
		electrode being situated on the same side of said first protonic conductive membrane as the counter electrode and having a surface thereon exposed to the water vapor in said means for exposing a surface of said counter electrode to said water vapor; and means for applying a DC power across the
		first protonic conductive electrolyte membrane, said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across the first protonic conductive electrolyte membrane; whereby the gas is transported away from the counter electrode
		when the DC power means applies a DC power to the first and second pump electrodes.

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
15	73	Unlike original patent claim 15, presented reissue claim 73 recites the language "a nonbiased electrochemical gas sensor for measurement of a gas in an ambient atmosphere" and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 15, presented reissue claim 73 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrical conducting material of the first and second pump electrodes is substantially composed of carbon."
16	73	Unlike original patent claim 16, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere" and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 16, presented reissue claim 73 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrical conducting material of the first and second pump electrodes is substantially composed of noble metals."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
17	73	Unlike original patent claim 17, presented reissue claim 73 recites the language "a nonbiased electrochemical gas sensor for measurement of a gas in an ambient atmosphere" and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 17, presented reissue claim 73 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrical conducting material of the first and second pump electrodes is substantially composed of conductive hydrated metal oxides."
18	73	Unlike original patent claim 18, presented reissue claim 73 recites the language "a nonbiased electrochemical gas sensor for measurement of a gas in an ambient atmosphere" and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 18, presented reissue claim 73 does not recite the language "quantitative measurement," and also does not recite the language "wherein at least one of the first and second pump electrodes is comprised of a film having a thickness in the range of about 50 Angstroms to 10,000 Angstroms."

Original Patent Claim	Presented Reissue Claim	Differences in Claim Language
19	73	Unlike original patent claim 19, presented reissue claim 73 recites the language "a nonbiased electrochemical gas sensor for measurement of a gas in an ambient atmosphere" and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 19, presented reissue claim 73 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrical conducting material of said first and second pump electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
20	73	Unlike original patent claim 20, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere" and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 20, presented reissue claim 73 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the first and second pump electrodes is a copolymer having a tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."

Original Patent Claim	Presented Reissue Claim	Differences in Claim Language
23	73	Unlike original patent claim 23, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere" and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
	73	Unlike original patent claim 23, presented reissue claim 73 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor further comprises: a second protonic conductive electrolyte membrane permeable to water vapor; first and second pump electrodes permeable to water vapor and comprised of an electron conductive material, and being separate from said sensing and counter electrodes and situated on opposite sides of and in contact with said second protonic conductive electrolyte membrane, said means for exposing a surface of said second pump electrode to said water vapor exposing a surface of said second pump electrode to said water vapor, and said first pump electrode having a surface exposed to the ambient atmosphere; and means for applying a DC power across said second protonic electrolyte membrane, said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across said second protonic electrolyte membrane; whereby the gas is transported away from the counter electrode when the DC power means applies a DC power to the first and second pump electrodes."  Unlike original patent claim 24, presented reissue claim 73 recites the language "a nonbiased electrochemical gas sensor for measurement of a gas in an ambient atmosphere" and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 24, presented reissue claim 73 does not recite the language "quantitative measurement," and also does not recite the language "wherein the second protonic conductive electrolyte membrane is substantially composed of a solid, perfluorinated, ion-exchange polymer."

Differences in Claim Language	Unlike original patent claim 25, presented reissue claim 73 recites the language "a nonbiased electrochemical gas sensor for measurement of a gas in an ambient atmosphere" and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 25, presented reissue claim 73 does not recite the language "wherein the second protonic conductive electrolyte membrane is a hydrated metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 26, presented reissue claim 73 recites the language "a nonbiased electrochemical gas sensor for measurement of a gas in an ambient atmosphere" and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 26, presented reissue claim 73 does not recite the language "wherein the surface area of the surface of said first pump electrode that is exposed to the ambient atmosphere is smaller than the surface area of the surface of the second pump electrode that is exposed to said water vapor, whereby the second protonic conductive electrolyte membrane is exposed to substantially 100 percent relative humidity, and a positive pressure of said water vapor exists from the surface of said second pump electrode that is exposed to said water vapor to the surface of said first pump electrode that is exposed to the ambient atmosphere."
Presented Reissue Claim	73		73	
Original Patent Claim	25		26	

Differences in Claim Language		Unlike original patent claim 29, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere" and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 29, presented reissue claim 73 does not recite the language "quantitative measurement," and also does not recite the language "wherein the gas is CO."	Unlike original patent claim 30, presented reissue claim 73 recites the language "a nonbiased electrochemical gas sensor for measurement of a gas in an ambient atmosphere" and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 30, presented reissue claim 73 does not recite the language "quantitative measurement," and also does not recite the language "wherein the gas is NO _x ."
Presented	Reissue Claim	73		73	
Original	Patent Claim	29		30	

Original     Presented     Differences in Claim Language       Patent Claim     Reissue Claim	Unlike original patent claim 31, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere" and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 31, presented reissue claim 73 does not recite the language "quantitative measurement," and also does not recite the language "wherein the gas is hydrogen."	Unlike original patent claim 32, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere" and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 32, presented reissue claim 73 does not recite the language "quantitative measurement," and also does not recite the language "wherein the gas is H ₂ S."
	yuage "a non- nosphere" and anges in said	the language in the gas is	"a non- sphere" and 1 said	anguage gas is H ₂ S."

Original	Presented	Differences in Claim Language
Patent Claim	~	
		Unlike original patent claim 33, presented reissue claim 73 recites the language "a non-
33	73	biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere" and
		also recites the language "said electrical measurement means detects changes in said
		electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 33, presented reissue claim 73 does not recite the language
		"quantitative measurement," and also does not recite the language "wherein the gas is H ₂ O
		Vapor
		Unlike original patent claim 34, presented reissue claim 73 recites the language "a non-
34	73	biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere" and
		also recites the language "said electrical measurement means detects changes in said
		electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 34, presented reissue claim 73 does not recite the language
		"quantitative measurement," and also does not recite the language "Wherein the gas is
		alconol vapor.

Differences in Claim Language	Unlike original patent claim 35, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 35, presented reissue claim 73 does not recite the language "quantitative measurement," does not recite the language "a second protonic conductive electrolyte membrane permeable to water vapor;" does not recite the language "and said first pump electrode having a surface exposed to the ambient atmosphere, said second pump electrode being separated from said counter electrode by said means for exposing a surface of said water vapor by said means for exposing a surface of said water vapor by said means for exposing a surface of said second pump electrode to said water vapor," and also does not recite the language "means for applying a DC power across said second protonic electrolyte membrane in electrical contact with said first and second pump electrodes; whereby the gas is transported away from the counter electrode when the DC power means applies a DC power across said second protonic electrolyte membrane."	Unlike original patent claim 36, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 36, presented reissue claim 73 does not recite the language "quantitative measurement," and also does not recite the language "wherein at least one of said first and second protonic conductive electrolyte membranes is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	73		73	
Original Patent Claim	35		36	

bd Differences in Claim Language	Unlike original patent claim 37, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 37, presented reissue claim 73 does not recite the language "quantitative measurement," and also does not recite the language "wherein at least one of the first and second protonic conductive electrolyte membranes is a hydrated metal oxide protonic conductor electrolyte membrane."  Unlike original patent claim 38, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 38, presented reissue claim 73 does not recite the language "quantitative measurement," and also does not recite the language "wherein the surface of said first pump electrode that is exposed to the ambient atmosphere has a surface area smaller than the surface area of the surface of the second pump electrode that is exposed to said water vapor, and wherein the surface of said sensing electrode that is exposed to the ambient atmosphere has a surface area smaller than the surface area of the surface of the counter electrode that is exposed to said water vapor, whereby the first protonic conductive electrolyte membrane is exposed to sustantially 100 percent relative humidity, a positive pressure of said water vapor exists from the surface of said counter electrode that is exposed to said water vapor to the surface of said sensing electrode that is exposed to substantially 100 percent relative humidity, and a positive pressure of said water vapor exists from the surface of said second pump electrode that is exposed to said water vapor to the surface of said first pump electrode that is exposed to the ambient atmosphere."
Presented Reissue Claim	73	73	
Original Patent Claim	37	38	

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
Q.	î	Unlike original patent claim 39, presented reissue claim 73 recites the language "a non-biased
39	/3	electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter
		electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor
		material and 50-90 wt % of a first and a second electrical conductor material," and also recites the
		language said electrical infeasurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 39, presented reissue claim 73 does not recite the language
		"quantitative measurement," and also does not recite the language "wherein the surface area of each
		of the surfaces of the second pump and counter electrodes that are exposed to said water vapor by
		said means for exposing a surface of said second pump electrode to said water vapor are each
		separated from said means for exposing a surface of said second pump electrode to said water vapor
		by a hydrophobic membrane permeable to water vapor and substantially impervious to water."
		Unlike original patent claim 40, presented reissue claim 73 recites the language "a non-biased
40	73	electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "wherein the electrical conducting material of at least one of said sensing and counter
		electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor
		material and 50-90 wt % of a first and a second electrical conductor material," and also recites the
		language "said electrical measurement means detects changes in said electrical characteristic in the
		absence of any biasing voltage."
		Unlike original patent claim 40, presented reissue claim 73 does not recite the language
		"quantitative measurement," and also does not recite the language "wherein said means for exposing
		a surface of said second pump electione to said water vapor furtific contains an antificeze additive.

Reissue Claim 73	Original	Presented	Differences in Claim Language
73	Patent Claim	Reissue Claim	
57			Unlike original patent claim 41, presented reissue claim 73 recites the language "a non-biased
73	41	73	electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
73			electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor
73			material and 50-90 wt % of a first and a second electrical conductor material," and also recites the
73			anguage said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
73		,	Unlike original patent claim 41 presented reissue claim 73 does not recite the language
73			"quantitative measurement," and also does not recite the language "wherein at least one of the
73			surfaces of said first protonic conductive electrolyte membrane in contact with one of the sensing
73			and counter electrodes is substantially nonplanar, and wherein at least one of the surfaces of said
73			second protonic conductive electrolyte membrane in contact with one of the first and second pump
73			This original natent claim 42 presented reissue claim 73 recites the language "a non-hiased
	42	73	electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton cormaterial and 50-90 wt % of a first and a second electrical conductor material," and also recilanguage "said electrical measurement means detects changes in said electrical characteristic absence of any biasing voltage."  Unlike original patent claim 42, presented reissue claim 73 does not recite the la "quantitative measurement," and also does not recite the language "wherein at least one sensing, counter, first pump, and second pump electrodes is comprised of film having a thick the range of about 50 Angstroms to 10,000 Angstroms."			language "wherein the electrical conducting material of at least one of said sensing and counter
material and 50-90 wt % of a first and a second electrical conductor material," and also recilianguage "said electrical measurement means detects changes in said electrical characteristic absence of any biasing voltage."  Unlike original patent claim 42, presented reissue claim 73 does not recite the la "quantitative measurement," and also does not recite the language "wherein at least one sensing, counter, first pump, and second pump electrodes is comprised of film having a thick the range of about 50 Angstroms to 10,000 Angstroms."			electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor
language "said electrical measurement means detects changes in said electrical characteristic absence of any biasing voltage."  Unlike original patent claim 42, presented reissue claim 73 does not recite the la "quantitative measurement," and also does not recite the language "wherein at least one sensing, counter, first pump, and second pump electrodes is comprised of film having a thick the range of about 50 Angstroms to 10,000 Angstroms."			material and 50-90 wt % of a first and a second electrical conductor material," and also recites the
Unlike original patent claim 42, presented reissue claim 73 does not recite the la "quantitative measurement," and also does not recite the language "wherein at least one sensing, counter, first pump, and second pump electrodes is comprised of film having a thick the range of about 50 Angstroms to 10,000 Angstroms."			language "said electrical measurement means detects changes in said electrical characteristic in the
Unlike original patent claim 42, presented reissue claim 73 does not recite the law "quantitative measurement," and also does not recite the language "wherein at least one sensing, counter, first pump, and second pump electrodes is comprised of film having a thick the range of about 50 Angstroms to 10,000 Angstroms."			absence of any biasing voltage."
"quantitative measurement," and also does not recite the language "wherein at least one sensing, counter, first pump, and second pump electrodes is comprised of film having a thick the range of about 50 Angstroms to 10,000 Angstroms."			Unlike original patent claim 42, presented reissue claim 73 does not recite the language
sensing, counter, first pump, and second pump electrodes is comprised of film having a unck the range of about 50 Angstroms to 10,000 Angstroms."			"quantitative measurement," and also does not recite the language "wherein at least one of the
			sensing, counter, first pump, and second pump electrodes is comprised of film having a unckness in the range of about 50 Angstroms to 10,000 Angstroms."

Original Patent Claim	Presented Reissue Claim	Differences in Claim Language
443	73	Unlike original patent claim 43, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 43, presented reissue claim 73 does not recite the language "quantitative measurement," and also does not recite the language "wherein the film is substantially composed of a noble metal."
44	73	Unlike original patent claim 44, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 44, presented reissue claim 73 does not recite the language "quantitative measurement," and also does not recite the language "wherein the noble metal is platinum."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
45	73	Unlike original patent claim 45, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere." also recites the
		language "wherein the electrical conducting material of at least one of said sensing and counter
		electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," and also recites the
		absence of any biasing voltage."
		Unlike original patent claim 45, presented reissue claim 73 does not recite the language
		"quantitative measurement," and also does not recite the language "wherein the at least one of the
		sensing, counter, first pump, and second pump electrodes is substantially comprised of proton conductive material."
		Unlike original patent claim 46, presented reissue claim 73 recites the language "a non-biased
46	73	electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "wherein the electrical conducting material of at least one of said sensing and counter
		electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor
		Inatelial and 20-30 wt /8 of a first and a second electrical conductor material, and also recites and language "said electrical measurement means detects changes in said electrical characteristic in the
		absence of any biasing voltage."
		Unlike original patent claim 40, presented reissue claim /3 does not recite the language "unantitative measurement" and also does not recite the language "wherein at least one of the first
		and second protonic conductive electrolyte membranes is substantially comprised of a solid,
		perfluorinated, ion-exchange polymer."

Differences in Claim Language	Unlike original patent claim 47, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 47, presented reissue claim 73 does not recite the language "quantitative measurement," and also does not recite the language "wherein at least one of the first and second protonic conductive electrolyte membranes is a hydrated metal oxide protonic conductive electrolyte membrane."	Unlike original patent claim 48, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 48, presented reissue claim 73 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrical conducting material of at least one of said sensing, counter, first pump, and second pump electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
Presented Reissue Claim	73	·	73	
Original Patent Claim	47		48	

Original Patent Claim	Presented Reissue Claim	Differences in Claim Language
49	73	Unlike original patent claim 49, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 49, presented reissue claim 73 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for said at least one of the sensing, counter, first pump, and second pump electrodes is a copolymer having a tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
50	73	Unlike original patent claim 50, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 50, presented reissue claim 73 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing, counter, first pump, and second pump electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing, counter, first pump and second pump electrodes is about 1-50 wt % of platinum."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
51	73	Unlike original patent claim 51, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said
		Unlike original patent claim 51, presented reissue claim 73 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing, counter, first pump, and second pump electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing, counter, first pump, and second pump electrodes is about 1-50 wt % of Ru oxide."
52	73	Unlike original patent claim 52, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 52, presented reissue claim 73 does not recite the language "quantitative measurement," and does not recite the language "a reference electrode permeable to water vapor and comprised of an electrical conducting material; a counter electrode permeable to water vapor and comprised of an electrical conducting material and being separate from both said sensing and reference electrodes, and being exposed to the ambient atmosphere; a protonic conductive electrolyte membrane permeable to water vapor, having top and bottom sides, said bottom side of said protonic conductive membrane being in contact with the counter electrode, and the top side of said protonic conductive membrane being in contact with the sensing and reference electrodes;" and also does not recite the language "wherein the electrical conducting material of at least one of said sensing, counter, and reference electrodes is a proton-electron mixed conductive material having 10-50 wt % of a first and a second electrical conductor material."

1 Differences in Claim Language	Unlike original patent claim 53, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 53, presented reissue claim 73 does not recite the language "quantitative measurement," and also does not recite the language "further comprising: means for applying a DC power across said protonic electrolyte membrane in electrical contact between the sensing electrode and said counter electrode, whereby the gas is transported away from the counter electrode when the DC power means applies a DC power across said protonic electrolyte membrane."	Unlike original patent claim 54, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 54, presented reissue claim 73 does not recite the language "quantitative measurement," and also does not recite the language "wherein said means for exposing a surface of said counter electrode to said water vapor further contains an antifreeze additive."
Presented Reissue Claim	73		73	
Original Patent Claim	53		54	

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
55	73	Unlike original patent claim 55, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 55, presented reissue claim 73 does not recite the language "quantitative measurement," and also does not recite the language "wherein the surface of said sensing electrode that is exposed to the ambient atmosphere has a surface area smaller than the surface area of the surface of the counter electrode that is exposed to said water vapor, whereby the first protonic conductive electrolyte membrane is exposed to substantially 100 percent relative humidity, and a positive pressure of said water vapor exists from the surface of said counter electrode that is exposed to said water vapor to the surface of said sensing electrode that is exposed to the ambient atmosphere."
99	73	Unlike original patent claim 56, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 56, presented reissue claim 73 does not recite the language "quantitative measurement," and also does not recite the language "wherein at least one of the surfaces of said protonic conductive electrolyte membrane in contact with one of the sensing, counter, and reference electrodes is substantially nonplanar."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
57	73	Unlike original patent claim 57, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere." also recites the
		language "wherein the electrical conducting material of at least one of said sensing and counter
		material and 50-90 wt % of a first and a second electrical conductor material," and also recites the
		language 'said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 57, presented reissue claim 73 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein one of the first and second electrical
		conductor materials for said at least one of the sensing, counter, first pump, and second pump electrodes
		is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials
		for said at least one of the sensing, counter, first pump, and second pump electrodes is about 1-50 wt % of Rn oxide."
		Unlike original patent claim 58, presented reissue claim 73 recites the language "a non-biased
58	73	electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "wherein the electrical conducting material of at least one of said sensing and counter
		material and 50-90 wt % of a first and a second electrical conductor material," and also recites the
		language "said electrical measurement means detects changes in said electrical characteristic in the
		absence of any biasing voltage."
		Unlike original patent claim 58, presented reissue claim 73 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein at least one of the sensing, counter, and
		reference electrodes is comprised of film having a thickness in the range of about 50 Angstroms to 10.000 Angstroms."

Differences in Claim Language	Unlike original patent claim 59, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 59, presented reissue claim 73 does not recite the language "quantitative measurement," and also does not recite the language "wherein the film is substantially composed of a noble metal."	Unlike original patent claim 60, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conductive material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 60, presented reissue claim 73 does not recite the language "quantitative measurement," and also does not recite the language "wherein the noble metal is platinum."
Presented Reissue Claim	73		73
Original Patent Claim	59		

ed Differences in Claim Language	Jaim	Unlike original patent claim 61, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 61, presented reissue claim 73 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."	Unlike original patent claim 62, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 62, presented reissue claim 73 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte
Presented	Reissue Claim	73		73	
Original	Patent Claim	61		62	

Differences in Claim Language	U	Unlike original patent claim 63, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 63, presented reissue claim 73 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for said at least one of the sensing, counter, and reference electrodes is a copolymer having a tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 64, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 64, presented reissue claim 73 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing, counter, and reference electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing, counter, and reference electrodes is about 1-50 wt % of platinum."
Presented	Reissue Claim	73		73	
Original	Patent Claim	63		64	

Differences in Claim Language	Unlike original patent claim 65, presented reissue claim 73 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a first and a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 65, presented reissue claim 73 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing, counter, and reference electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing, counter, and reference electrodes is about 1-50 wt % of Ru oxide."
Presented Reissue Claim	73	
Original Patent Claim	99	

Patent Claim    Reissue Claim   Unlike original patent claim 1, presented reissue claim 74 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 1, presented reissue claim 74 does not recite the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 2, presented reissue claim 74 does not recite the language "quantitative measurement," or the language "wherein said water vapor containing means contains a volume of water and an antifreeze additive."	Original	Presented	Differences in Claim Language
74	Patent Claim	Reissue Claim	
74			Unlike original patent claim 1, presented reissue claim 74 recites the language "a non-biased
74		74	electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites
74			the language "the sensing electrode and the counter electrode are the only two electrodes in
74			contact with the first protonic conductive electrolyte membrane," and also recites the
74			language "said electrical measurement means detects changes in said electrical characteristic
74			in the absence of any biasing voltage."
74			
74			Unlike original patent claim 1, presented reissue claim 74 does not recite the language
74			"quantitative measurement."
74			Unlike original patent claim 2, presented reissue claim 74 recites the language "a non-biased
the language "the sensing electrode and the counter electrode are the only two electro contact with the first protonic conductive electrolyte membrane," and also recit language "said electrical measurement means detects changes in said electrical charact in the absence of any biasing voltage."  Unlike original patent claim 2, presented reissue claim 74 does not recite the language "quantitative measurement," or the language "wherein said water vapor containing meacontains a volume of water and an antifreeze additive."	2	74	electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites
contact with the first protonic conductive electrolyte membrane," and also recitt language "said electrical measurement means detects changes in said electrical charact in the absence of any biasing voltage."  Unlike original patent claim 2, presented reissue claim 74 does not recite the language "quantitative measurement," or the language "wherein said water vapor containing mea contains a volume of water and an antifreeze additive."			the language "the sensing electrode and the counter electrode are the only two electrodes in
language "said electrical measurement means detects changes in said electrical charact in the absence of any biasing voltage."  Unlike original patent claim 2, presented reissue claim 74 does not recite the language "quantitative measurement," or the language "wherein said water vapor containing measurement," and an antifreeze additive."			contact with the first protonic conductive electrolyte membrane," and also recites the
in the absence of any biasing voltage."  Unlike original patent claim 2, presented reissue claim 74 does not recite the language "quantitative measurement," or the language "wherein said water vapor containing measurement," and an antifreeze additive."			language "said electrical measurement means detects changes in said electrical characteristic
Unlike original patent claim 2, presented reissue claim 74 does not recite the language "quantitative measurement," or the language "wherein said water vapor containing measurement and an antifreeze additive."			
Unlike original patent claim 2, presented reissue claim 74 does not recite the language "quantitative measurement," or the language "wherein said water vapor containing measurement and an antifreeze additive."			
"quantitative measurement," or the language "wherein said water vapor containing mea			Unlike original patent claim 2, presented reissue claim 74 does not recite the language
contains a volume of water and an antifreeze additive."			"quantitative measurement," or the language "wherein said water vapor containing means
			contains a volume of water and an antifreeze additive."

electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 3, presented resiste claim 74 does not recite the language "quantitative measurement," and does not recite the language "wherein the surface of said sensing electrode that is exposed to the ambient atmosphere has a surface area that is smaller than the surface area of the surface of the counter electrode that is exposed to said water vapor, whereby the first protonic conductive electrolyte membrane is exposed to substantially 100 percent relative humidity, and a positive pressure of said water vapor exisis from the surface of said counter electrode exposed to said water vapor to the surface of said sensing electrode exposed to the ambient atmosphere."  Unlike original patent claim 4, presented reissue claim 74 recites the language "a non-biased electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 4, presented reissue claim 74 does not recite the language "quantitative measurement," and does not recite the language "wherein the surface area of the surface of the counter electrode sind water vapor is separated from said the surface of the surface of the service that is exposed to said water vapor is separated from said the surface of the surface of the service that is exposed to said water vapor is esparated from said the surface of the
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Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
5	74	Unlike original patent claim 5, presented reissue claim 74 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites
		the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the
		language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 5, presented reissue claim 74 does not recite the language "quantitative measurement," and does not recite the language "wherein the first protonic
		conductive electrolyte membrane has opposing surfaces, each of said opposing surfaces
		opposing surfaces of said first protonic conductive electrolyte membrane in contact with one
		of the sensing and counter electrodes is substantially nonplanar."
		Unlike original patent claim 6, presented reissue claim 74 recites the language "a non-biased
9	74	electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in
		contact with the first protonic conductive electrolyte membrane," and also recites the
		language "said electrical measurement means detects changes in said electrical characteristic
		in the absence of any biasing voltage."
		Unlike original patent claim 6, presented reissue claim 74 does not recite the language
		"quantitative measurement," and does not recite the language "wherein at least one of the
		sensing and counter electrodes is comprised of film having a thickness in the range of about
		50 Angsmons to 10,000 Angsmons.

Differences in Claim Language	Unlike original patent claim 7, presented reissue claim 74 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 7, presented reissue claim 74 does not recite the language "quantitative measurement," and does not recite the language "wherein the film is substantially composed of a noble metal."	Unlike original patent claim 8, presented reissue claim 74 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 8, presented reissue claim 74 does not recite the language "quantitative measurement," and does not recite the language "wherein the noble metal is platinum."
Presented Reissue Claim	74		74	
Original Patent Claim	7		∞	

Original Presented Differences in Claim Language Patent Claim Reissue Claim	Onlike original patent claim 9, presented reissue claim 74 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 9, presented reissue claim 74 does not recite the language "quantitative measurement," and does not recite the language "wherein the first protonic conductive electrolyte membrane is substantially composed of a solid, perfluorinated, ionexchange polymer."	Unlike original patent claim 10, presented reissue claim 74 recites the language "a non- biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 10, presented reissue claim 74 does not recite the language "quantitative measurement," and does not recite the language "wherein the first protonic conductive electrolyte membrane is a hydrated metal oxide protonic conductor electrolyte membrane."
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Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
11	74	Unlike original patent claim 11, presented reissue claim 74 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also
		recites the language "the sensing electrode and the counter electrode are the only two
		electrodes in contact with the first protonic conductive electrolyte membrane," and also
		recites the language "said electrical measurement means detects changes in said electrical
		characteristic in the absence of any biasing voltage."
		Unlike original patent claim 11, presented reissue claim 74 does not recite the language
		"quantitative measurement," and also does not recite the language "wherein the proton
		conductor material for said at least one of the sensing and counter electrodes is a copolymer
		having a tetrafluoroethylene backbone with a side chain of perfluorinated monomers
		containing at least one of a sulfonic acid group or a carboxylic acid group."
		Unlike original patent claim 12, presented reissue claim 74 recites the language "a non-
12	74	biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also
		recites the language "the sensing electrode and the counter electrode are the only two
		electrodes in contact with the first protonic conductive electrolyte membrane," and also
		recites the language "said electrical measurement means detects changes in said electrical
		characteristic in the absence of any biasing voltage."
		Unlike original patent claim 12, presented reissue claim 74 does not recite the language
		"quantitative measurement," and also does not recite the language "wherein one of the first
		and second electrical conductor materials for said at least one of the sensing and counter
		electrodes is about 50-99 wt % of carbon black, and the other of the first and second
		electrical conductor materials for said at least one of the sensing and counter electrodes is
		about 1-50 wt % of platinum."

Original Patent Claim	Presented Reissue Claim	Differences in Claim Language
13	74	Unlike original patent claim 13, presented reissue claim 74 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 13, presented reissue claim 74 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing and counter electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing and counter electrodes is about 1-50 wt % of Ru oxide."
14	74	Unlike original patent claim 14, presented reissue claim 74 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
· ,		Unlike original patent claim 14, presented reissue claim 74 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor further comprises: first and second pump electrodes comprised of an electrical conducting material permeable to water vapor, separate from said sensing and counter electrodes, and situated on opposite sides of and in contact with said first protonic conductive electrodes, and situated on poposite electrode being situated on the same side of said first protonic conductive membrane as the counter electrode and having a surface thereon exposed to the water vapor in said means for exposing a surface of said counter electrode to said water vapor; and means for applying a DC power across the
		first protonic conductive electrolyte membrane, said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across the first protonic conductive electrolyte membrane; whereby the gas is transported away from the counter electrode when the DC power means applies a DC power to the first and second pump electrodes."

Original Patent Claim	Presented Reissue Claim	Differences in Claim Language
15	74	Unlike original patent claim 15, presented reissue claim 74 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 15, presented reissue claim 74 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrical conducting material of the first and second pump electrodes is substantially composed of carbon."
16	74	Unlike original patent claim 16, presented reissue claim 74 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 16, presented reissue claim 74 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrical conducting material of the first and second pump electrodes is substantially composed of noble metals."

d Differences in Claim Language	aim	Unlike original patent claim 17, presented reissue claim 74 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also	recites the language "the sensing electrode and the counter electrode are the only two	recites the language "said electrical measurement means detects changes in said electrical	characteristic in the absence of any biasing voltage."	Unlike original patent claim 17, presented reissue claim 74 does not recite the language	"quantitative measurement," and also does not recite the language "wherein the electrical	conducting material of the first and second pump electrodes is substantially composed of	Unlike original patent claim 18, presented reissue claim 74 recites the language "a non-	biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also	recites the language "the sensing electrode and the counter electrode are the only two	electrodes in contact with the first protonic conductive electrolyte membrane," and also	recites the language "said electrical measurement means detects changes in said electrical	characteristic in the absence of any biasing voltage."	Unlike original patent claim 18, presented reissue claim 74 does not recite the language	'"quantitative measurement," and also does not recite the language "wherein at least one of	the first and second pump electrodes is comprised of a film having a thickness in the range	of about 50 Angstroms to 10,000 Angstroms."
Presented	Reissue Claim	74								74								,
Original	Patent Claim	17								18								

Original 19 20	Presented Reissue Claim 74	Unlike original patent claim 19, presented reissue claim 74 recites the language "a nonbiased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 19, presented reissue claim 74 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrical conductive material of said first and second pump electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."  Unlike original patent claim 20, presented reissue claim 74 recites the language "the sensing electrode and the counter electrode are the only two electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 20, presented reissue claim 74 does not recite the language "said electrical measurement means detects changes in said electrical conductor material for both the first and second pump electrodes is a copolymer having a conductor material for both the first and second pump electrodes are copolymer having a conductor material for both the first and second pump pelectrodes is a copolymer having a conductor material for the proton conductor material for both the first and second pump pelectrodes is a copolymer having a conductor material for the proton conductor material for the part claim 20, presented reissue claim 74 does not recite the language."
		least one of a sulfonic acid group or a carboxylic acid group."

Differences in Claim Language	Unlike original patent claim 21, presented reissue claim 74 recites the language "a nonbiased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 21, presented reissue claim 74 does not recite the language "wherein one of the first and second electrical conductor materials for the first pump electrode is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for the first pump electrode is 1 to 50 wt % of platinum."	Unlike original patent claim 22, presented reissue claim 74 recites the language "a nonbiased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 22, presented reissue claim 74 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the second pump electrode is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for the second pump electrode is 1 to 50 wt % of Ru oxide."
Presented Reissue Claim	74	74
Original Patent Claim	21	22

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
23	74	Unlike original patent claim 23, presented reissue claim 74 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical
		measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
•		Unlike original patent claim 23, presented reissue claim 74 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor further
		comprises: a second protonic conductive electrolyte membrane permeable to water vapor; first and
		second pump electrodes permeable to water vapor and comprised of an electron conductive material, and being separate from said sensing and counter electrodes and situated on opposite sides of and in
		contact with said second protonic conductive electrolyte membrane, said means for exposing a
		surface of said counter electrode to said water vapor exposing a surface of said second pump electrode to said water vapor, and said first pump electrode having a surface exposed to the ambient
		atmosphere; and means for applying a DC power across said second protonic electrolyte membrane,
		said first and second pump electrodes having in electrical connection therebetween said means for
		applying DC power across said second protonic electrolyte membrane; whereby the gas is transported away from the counter electrode when the DC power means applies a DC power to the first and
		second pump electrodes."
		Unlike original patent claim 24, presented reissue claim 74 recites the language "a non-biased
24	74	electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "the sensing electrode and the counter electrode are the only two electrodes in contact with
		the first protonic conductive electrolyte membrane," and also recites the language "said electrical
		measurement means detects changes in said electrical characteristic in the absence of any biasing
		Voltage.
		Unlike original patent claim 24, presented reissue claim 74 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the second protonic conductive alectrolyte membrane is substantially composed of a solid nerfluorinated ion-exchange nolymer."
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Presented Differences in Claim Language Reissue Claim	Unlike original patent claim 25 presented reissue claim 74 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 25, presented reissue claim 74 does not recite the language "quantitative measurement," and also does not recite the language "wherein the second protonic conductive electrolyte membrane is a hydrated metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 26, presented reissue claim 74 recites the language "a nonbiased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 26, presented reissue claim 74 does not recite the language "quantitative measurement," and also does not recite the language "wherein the surface area of the surface of said first pump electrode that is exposed to the ambient atmosphere is smaller than the surface area of the surface of the second pump electrode that is exposed to said water vapor, whereby the second protonic conductive electrolyte membrane is exposed to substantially 100 percent relative humidity, and a positive pressure of said water vapor exists from the surface of said second pump electrode that is exposed to said water vapor to the surface of said first pump electrode that is exposed to the ambient atmosphere."
Pr Reis				
Original Patent Claim	25		26	

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
27	74	Unlike original patent claim 27, presented reissue claim 74 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 27, presented reissue claim 74 does not recite the language "quantitative measurement," and also doe snot recite the language "wherein the surface area of the surface of the second pump electrode that is exposed to said water vapor is separated from said means for exposing a surface of said counter electrode to said water vapor by a hydrophobic membrane permeable to water vapor and substantially impervious to water."
28	74	Unlike original patent claim 28, presented reissue claim 74 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 28, presented reissue claim 74 does not recite the language "quantitative measurement," and also does not recite the language "further comprising: means for applying a DC pulse power source across the first protonic conductive membrane, said sensing and counter electrodes having in electrical connection therebetween said means for alternating DC pulse power across the first protonic conductive membrane; and switch means for alternating the connection between the sensing and counter electrodes from the electrical measurement means to the DC pulse power means; whereby, in a positive ambient atmosphere concentration of said gas, said electrical measurement means detects changes in said electrical characteristic when said switch means connects said electrical measurement means to the sensing and counter electrodes; and whereby said DC pulse power means moves the gas away from a side of the gas sensor where the counter electrode is placed when said switch means connects said DC pulse power means to the sensing and counter electrodes."

Original Patent Claim	Presented Reissue Claim	Differences in Claim Language
29	74	Unlike original patent claim 29, presented reissue claim 74 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also
		recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also
		recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 29, presented reissue claim 74 does not recite the language "quantitative measurement," and also does not recite the language "wherein the gas is CO."
30	74	Unlike original patent claim 30, presented reissue claim 74 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also
		recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 30, presented reissue claim 74 does not recite the language "quantitative measurement," and also does not recite the language "wherein the gas is NO _x ."

Differences in Claim Language	Unlike original patent claim 31, presented reissue claim 74 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 31, presented reissue claim 74 does not recite the language "quantitative measurement," and also does not recite the language "wherein the gas is hydrogen."	Unlike original patent claim 32, presented reissue claim 74 recites the language "a nonbiased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 32, presented reissue claim 74 does not recite the language "quantitative measurement," and also does not recite the language "wherein the gas is H ₂ S."
Presented Reissue Claim	74		74
Original Patent Claim	31		32

Differences in Claim Language	Unlike original patent claim 33, presented reissue claim 74 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 33, presented reissue claim 74 does not recite the language "quantitative measurement," and also does not recite the language "wherein the gas is $H_2O$ vapor."	Unlike original patent claim 34, presented reissue claim 74 recites the language "a nonbiased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 34, presented reissue claim 74 does not recite the language "quantitative measurement," and also does not recite the language "wherein the gas is alcohol vapor."	
Presented Reissue Claim	74		74	
Original Patent Claim	33		34	

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
35	74	Unlike original patent claim 35, presented reissue claim 74 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language
		"the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material basing 10.50
		wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material,"
		and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
٠	·	Unlike original patent claim 35, presented reissue claim 74 does not recite the language "quantitative"
		measurement," does not recite the language "a second protonic conductive electrolyte membrane permeable
		to water vapor;" does not recite the language "and said first pump electrode having a surface exposed to the ambient atmosphere said second mum electrode being senarated from said counter electrode by said means
		for exposing a surface of said second pump electrode to said water vapor, and said counter electrode having a
		surface exposed to said water vapor by said means for exposing a surface of said second pump electrode to
		protonic electrolyte membrane in electrical contact with said first and second pump electrodes; whereby the
		gas is transported away from the counter electrode when the DC power means applies a DC power across
		Unlike original patent claim 36, presented reissue claim 74 recites the language "a non-biased
36	74	electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language
		"the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic
		conductive electrolyte memorane, also recites the language—wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50
		wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material,"
		and also recites the language "said electrical measurement means detects changes in said electrical
		Characteristic in the adsence of any diasting voltage.
		Unlike original patent claim 36, presented reissue claim 74 does not recite the language "quantitative measurement" and also does not recite the language "wherein at least one of said first and second protonic
		conductive electrolyte membranes is substantially comprised of a solid, perfluorinated, ion-exchange
_		polymer."

Differences in Claim Language	Unlike original patent claim 37, presented reissue claim 74 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 37, presented reissue claim 74 does not recite the language "quantitative measurement," and also does not recite the language "wherein at least one of the first and second protonic conductive electrolyte membranes is a hydrated metal oxide protonic conductor electrolyte membrane."	Unlike original patent claim 38, presented reissue claim 74 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a protonelectron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 38, presented reissue claim 74 does not recite the language "quantitative measurement," and also does not recite the language "wherein the surface of said first pump electrode that is exposed to the ambient atmosphere has a surface area smaller than the surface area of the surface of the surface of the ambient atmosphere has a surface area smaller than the surface area of the counter electrode that is exposed to the ambient atmosphere has a surface area smaller than the surface area of the surface of the counter electrode that is exposed to said water vapor, whereby the first protonic conductive electrolyte membrane is exposed to substantially 100 percent relative humidity, a positive pressure of said water vapor exists from the surface of said counter electrode that is exposed to said water vapor to the surface of said sensing electrode that is exposed to the ambient atmosphere, the second protonic conductive electrolyte membrane is exposed to substantially 100 percent relative humidity, and a positive pressure of said water vapor exists from the surface of said second pump electrode that is exposed to the surface of said first pump electrode that is exposed to the ambient atmosphere."
Presented Reissue Claim	74		47	
Original Patent Claim	37		38	

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
39	74	Unlike original patent claim 39, presented reissue claim 74 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language
		"the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," also recites the language "wherein the electrical conducting material of at
		least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
_		and also recites the language "said electrical measurement means detects changes in said electrical
		characteristic in the absence of any biasing voltage."
		Unlike original patent claim 39, presented reissue claim 74 does not recite the language "quantitative
		second pump and counter electrodes that are exposed to said water vapor by said means for exposing a
		surface of said second pump electrode to said water vapor are each separated from said means for exposing a
		surface of said second pump electrode to said water vapor by a hydrophobic membrane permeable to water vapor and substantially impervious to water."
40	74	electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language
		"the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic
		conductive electrolyte membrane," also recites the language "Wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50
		wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material,"
		and also recites the language "said electrical measurement means detects changes in said electrical
		characteristic in the absence of any diasting voltage.
		Unlike original patent claim 40, presented reissue claim 74 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein said means for exposing a surface of said second numb electrode to said water vapor further contains an antifreeze additive."

Differences in Claim Language	Unlike original patent claim 41, presented reissue claim 74 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the	the first protonic conductive electrolyte membrane," also recites the language "wherein the electrical the first protonic conductive electrolyte membrane," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and	means detects changes in said electrical characteristic in the absence of any biasing voltage."	"quantitative measurement," and also does not recite the language "wherein at least one of the	surfaces of said first protonic conductive electrolyte membrane in contact with one of the sensing and counter electrodes is substantially nonplanar, and wherein at least one of the surfaces of said second protonic conductive electrolyte membrane in contact with one of the first and second pump	rectrodes is substantially nonpianar.	electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the	the first protonic conductive electrolyte membrane," also recites the language "wherein the electrical	conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and	a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 42, presented reissue claim 74 does not recite the language "quantitative measurement," and also does not recite the language "wherein at least one of the sensing, counter, first pump, and second pump electrodes is comprised of film having a thickness in the range of about 50 Angstroms to 10,000 Angstroms."
Presented Reissue Claim	74						74				
Original Patent Claim	41						42				

Differences in Claim Language	Unlike original patent claim 43, presented reissue claim 74 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the	the first protonic conductive electrolyte membrane," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed	a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 43, presented reissue claim 74 does not recite the language "quantitative measurement," and also does not recite the language "wherein the film is substantially composed of a noble metal."	Unlike original patent claim 44, presented reissue claim 74 recites the language "a non-biased	language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane." also recites the language "wherein the electrical	a second electrical conductor material," and also recites the language "said electrical measurement	means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 44, presented reissue claim 74 does not recite the language "quantitative measurement," and also does not recite the language "wherein the noble metal is	platinum."
Presented Reissue Claim	74				Ī	<b>1</b>	 			
Original Patent Claim	43					<del>4</del>				

Differences in Claim Language	Unlike original patent claim 47, presented reissue claim 74 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," also recites the language "wherein the electrical conductive material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 47, presented reissue claim 74 does not recite the language "quantitative measurement," and also does not recite the language "wherein at least one of the first and second protonic conductive electrolyte membranes is a hydrated metal oxide protonic conductive electrolyte membrane."	Unlike original patent claim 48, presented reissue claim 74 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," also recites the language "wherein the electrical conductive material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 48, presented reissue claim 74 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrical conducting material of at least one of said sensing, counter, first pump, and second pump electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."
Presented Reissue Claim	74		74	
Original Patent Claim	47		48	

Differences in Claim Language	Unlike original patent claim 49, presented reissue claim 74 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 49, presented reissue claim 74 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for said at least one of the sensing, counter, first pump, and second pump electrodes is a copolymer having a tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 50, presented reissue claim 74 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 50, presented reissue claim 74 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing, counter, first pump, and second pump electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing, counter, first pump and second pump electrodes is about 1-50 wt % of platinum."
Presented Reissue Claim	74		74	
Original Patent Claim	49		50	

Differences in Claim Language	Unlike original patent claim 51, presented reissue claim 74 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 51, presented reissue claim 74 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing, counter, first pump, and second pump electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing, counter, first pump, and second pump electrodes is about 1-50 wt % of Ru oxide."	Unlike original patent claim 52, presented reissue claim 74 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 52, presented reissue claim 74 does not recite the language "quantitative measurement," and does not recite the language "a reference electrode permeable to water vapor and comprised of an electrical conducting material and being separate from both said sensing and reference electrodes, and being exposed to the ambient atmosphere; a protonic conductive electrolyte membrane permeable to water vapor, having top and bottom sides, said bottom side of said protonic conductive membrane being in contact with the counter electrode, and the top side of said protonic conductive membrane being in contact with the sensing and reference electrodes," and also does not recite the language "wherein the electrical conducting material of at least one of said sensing, counter, and reference electrodes is a proton-electron mixed conductive material."
Presented Reissue Claim	74		74	
Original Patent Claim	51		52	

Original Patent Claim	Presented Reissue Claim	Differences in Claim Language Unlike original patent claim 55, presented reissue claim 74 recites the language "a non-biased
55	74	electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," also recites the language "wherein the electrical
		conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 55, presented reissue claim 74 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the surface of said sensing electrode that is exposed to the ambient atmosphere has a surface area smaller than the surface area of the surface of the counter electrode that is exposed to said water vapor, whereby the first protonic conductive
		electrolyte membrane is exposed to substantially 100 percent relative humidity, and a positive pressure of said water vapor exists from the surface of said counter electrode that is exposed to said water vapor
		to the surface of said sensing electrode that is exposed to the ambient atmosphere."  Unlike original patent claim 56, presented reissue claim 74 recites the language "a non-biased
56	74	electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," also recites the language "wherein the electrical
		conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a
		second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike orioinal natent claim 56 presented reissue claim 74 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein at least one of the surfaces of said
		protonic conductive electroryte memorane in conder with one of the sensing, counter, and reference electrodes is substantially nonplanar."

Differences in Claim Language	Unlike original patent claim 59, presented reissue claim 74 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 59, presented reissue claim 74 does not recite the language "quantitative measurement," and also does not recite the language "wherein the film is substantially composed of a noble metal."	Unlike original patent claim 60, presented reissue claim 74 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," also recites the language "wherein the electrical conductive material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."  Unlike original patent claim 60, presented reissue claim 74 does not recite the language "quantitative measurement," and also does not recite the language "wherein the noble metal is platinum."
Presented Reissue Claim	74		74
Original Patent Claim	59		09

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
19	74	Unlike original patent claim 61, presented reissue claim 74 recites the language "a non-biased electrochemical as sensor for measurement of a gas in an ambient atmosphere," also regites the
10	<u> </u>	language "the sensing electrode and the counter electrode are the only two electrodes in contact with the
		first protonic conductive electrolyte membrane," also recites the language "wherein the electrical
		conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a
		second electrical conductor material," and also recites the language "said electrical measurement means
		detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 61, presented reissue claim 74 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the protonic conductive electrolyte
		membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
		Unlike original patent claim 62, presented reissue claim 74 recites the language "a non-biased
62	74	electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "the sensing electrode and the counter electrode are the only two electrodes in contact with the
		first protonic conductive electrolyte memorane, also recites the language wherein the electrical
		conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a
		second electrical conductor material," and also recites the language "said electrical measurement means
		detects changes in said electrical characteristic in the absence of any biasing voltage."
		Unlike original patent claim 62, presented reissue claim 74 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte
		membrane is a hydrated metal oxide protonic conductor electrolyte membrane."

Differences in Claim Language	Unlike original patent claim 63, presented reissue claim 74 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," also recites the language "wherein the electrical conductive material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 63, presented reissue claim 74 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for said at least one of the sensing, counter, and reference electrodes is a copolymer having a tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 64, presented reissue claim 74 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," also recites the language "wherein the electrical conductive material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," and also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage."	Unlike original patent claim 64, presented reissue claim 74 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing, counter, and reference electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing, counter, and reference electrodes is about 1-50 wt % of platinum."
Presented Reissue Claim	74		74	
Original Patent Claim	63			

Differences in Claim Language		Unlike original patent claim 64, presented reissue claim 74 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the	language "the sensing electrode and the counter electrode are the only two electrodes in contact with the first protonic conductive electrolyte membrane," also recites the language "wherein the electrical	conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a	second electrical conductor material," and also recites the language "said electrical measurement means	detects changes in said electrical characteristic in the absence of any diasing voltage.	Unlike original patent claim 65, presented reissue claim 74 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical	conductor materials for said at least one of the sensing, counter, and reference electrodes is about 50-99	wt % of carbon black, and the other of the first and second electrical conductor materials for said at least	one of the sensing, counter, and reference electrodes is about 1-50 wt % of Ru oxide."	
Presented	Reissue Claim	74									
Original	Patent Claim	\$9									

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
1	75	Unlike original patent claim 1, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites
		the language "said electrical measurement means detects changes in said electrical
		characteristic in the absence of any biasing voltage," and also recites the language "the
		sensing electrode reacts with the gas to produce a change in electrical characteristic between
		the sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode."
		Unlike original patent claim 1, presented reissue claim 75 does not recite the language
		"quantitative measurement."
		Unlike original patent claim 2, presented reissue claim 75 recites the language "a non-biased
2	75	electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites
		the language "said electrical measurement means detects changes in said electrical
		characteristic in the absence of any biasing voltage," and also recites the language "the
		sensing electrode reacts with the gas to produce a change in electrical characteristic between
		the sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode."
		Unlike original patent claim 2, presented reissue claim 75 does not recite the language
		"quantitative measurement," or the language "wherein said water vapor containing means
		contains a volume of water and an antitreeze additive."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
3	75	Unlike original patent claim 3, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrode reacts with the
		gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 3, presented reissue claim 75 does not recite the language "quantitative measurement." and does not recite the language "wherein the surface of said sensing electrode that is
		exposed to the ambient atmosphere has a surface area that is smaller than the surface area of the
		surface of the counter electrode that is exposed to said water vapor, whereby the first protonic conductive electrolyte membrane is exposed to substantially 100 percent relative humidity, and a
		positive pressure of said water vapor exists from the surface of said counter electrode exposed to said water vapor to the surface of said sensing electrode exposed to the ambient atmosphere."
	31	Unlike original patent claim 4, presented reissue claim 75 recites the language "a non-biased
4	ς	language "said electrical measurement means detects changes in said electrical characteristic in the
		absence of any biasing voltage," and also recites the language "the sensing electrode reacts with the pas to produce a change in electrical characteristic between the sensing electrode and the counter
		electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 4, presented reissue claim 75 does not recite the language "quantitative
		measurement," and does not recite the language "wherein the surface area of the surface of the
		counter electrode that is exposed to said water vapor is separated itom said inealis for exposing a surface of said counter electrode to said water vapor by a hydrophobic membrane permeable to water
		vapor and substantially impervious to water."

Differences in Claim Language	U	Unlike original patent claim 5, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the	absence of any biasing voltage," and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter	electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 5, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the	language "said electrical measurement means detects changes in said electrical characteristic in the	absence of any biasing voltage," and also recites the language "the sensing electrode reacts with the	gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 6, presented reissue claim 75 recites the language "a non-biased	electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the	language "said electrical measurement means detects changes in said electrical characteristic in the	absence of any biasing voltage," and also recites the language "the sensing electrode reacts with the	gas to produce a change in electrical characteristic between the sensing electrode and the counter	electrode in the absence of an applied voltage to the sensing electrode.	Unlike original patent claim 6, presented reissue claim 75 recites the language "a non-biased	electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the	language "said electrical measurement means detects changes in said electrical characteristic in the	absence of any biasing voltage," and also recites the language "the sensing electrode reacts with the	gas to produce a change in electrical characteristic between the sensing electrode and the counter	alantande in the absence of an annlied voltage to the sensing electrode."
Presented	Reissue Claim	75								75									,	
Original	Patent Claim	5								9										

Original Patent Claim	Presented Reissue Claim	Differences in Claim Language
7	75	Unlike original patent claim 7, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 7, presented reissue claim 75 does not recite the language "quantitative measurement," and does not recite the language "wherein the film is substantially composed of a noble metal."
∞	75	Unlike original patent claim 8, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 8, presented reissue claim 75 does not recite the language "quantitative measurement," and does not recite the language "wherein the noble metal is platinum."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
6	75	Unlike original patent claim 9, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere", also recites
`		the language "said electrical measurement means detects changes in said electrical
		characteristic in the absence of any biasing voltage," and also recites the language "the
		sensing electrode reacts with the gas to produce a change in electrical characteristic between
		the sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode."
		Unlike original patent claim 9, presented reissue claim 75 does not recite the language
		"quantitative measurement," and does not recite the language "wherein the first protonic
		conductive electrolyte membrane is substantially composed of a solid, perfluorinated, ion-
		exchange polymer.
		Unlike original patent claim 10, presented reissue claim 75 recites the language "a non-
10	75	biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also
		recites the language "said electrical measurement means detects changes in said electrical
		characteristic in the absence of any biasing voltage," and also recites the language "the
		sensing electrode reacts with the gas to produce a change in electrical characteristic between
		the sensing electrode and the counter electrode in the absence of an applied voltage to the
		Scholing circulate.
		Unlike original patent claim 10, presented reissue claim 75 does not recite the language
		"quantitative measurement," and does not recite the language "wherein the first protonic
		conductive electrolyte membrane is a hydrated metal oxide protonic conductor electrolyte
		inclibranc.

Original Patent Claim	Presented Reissue Claim	Differences in Claim Language
	75	Unlike original patent claim 11, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also
		recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage," and also recites the language "the
		sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode."
		Unlike original patent claim 11, presented reissue claim 75 does not recite the language
		"quantitative measurement," and also does not recite the language "wherein the proton
		conductor material for said at least one of the sensing and counter electrodes is a coportined having a tetrafluoroethylene backbone with a side chain of perfluorinated monomers
		containing at least one of a sulfonic acid group or a carboxylic acid group."
		Unlike original patent claim 12, presented reissue claim 75 recites the language "a non-
12	75	biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also
		recites the language "said electrical measurement means detects changes in said electrical
		characteristic in the absence of any biasing voltage," and also recites the language "the
		sensing electrode reacts with the gas to produce a change in electrical characteristic between
		the sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode."
		Unlike original patent claim 12, presented reissue claim 75 does not recite the language
		"quantitative measurement," and also does not recite the language "wherein one of the first
		and second electrical conductor materials for said at least one of the sensing and counter
		electrodes is about 50-99 wt % of carbon black, and the other of the first and second
		electrical conductor materials for said at least one of the sensing and counter electrodes is
		about 1-30 wt % of piatinum.

Original Patent Claim	Presented Reissue Claim	Differences in Claim Language
13	75	Unlike original patent claim 13, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 13, presented reissue claim 75 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing and counter electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing and counter electrodes is about 1-50 wt % of Ru oxide."
14	7.5	Unlike original patent claim 14, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 14, presented reissue claim 75 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrochemical gas sensor further comprises: first and second pump electrodes comprised of an electrical conducting material permeable to water vapor, separate from said sensing and counter electrodes, and situated on opposite sides of and in contact with said first protonic conductive electrolyte membrane, said second pump electrode being situated on the same side of said first protonic conductive membrane as the counter electrode and having a surface thereon exposed to the water vapor in said means for exposing a surface of said counter electrode to said water vapor; and means for ambying a DC power across the
		first protonic conductive electrolyte membrane, said first and second pump electrodes having in electrical connection therebetween said means for applying DC power across the first protonic conductive electrolyte membrane; whereby the gas is transported away from the counter electrode when the DC power means applies a DC power to the first and second pump electrodes."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
		Unlike original patent claim 15, presented reissue claim 75 recites the language "a non-
15	75	biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "said electrical measurement means detects changes in said electrical
		characteristic in the absence of any biasing voltage," and also recites the language "the
		sensing electrode reacts with the gas to produce a change in electrical characteristic between
		the sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode."
		Unlike original patent claim 15, presented reissue claim 75 does not recite the language
		"quantitative measurement," and also does not recite the language "wherein the electrical
		conducting material of the first and second pump electrodes is substantially composed of
		carbon."
		Unlike original patent claim 16, presented reissue claim 75 recites the language "a non-
16	75	biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also
		recites the language "said electrical measurement means detects changes in said electrical
		characteristic in the absence of any biasing voltage," and also recites the language "the
		sensing electrode reacts with the gas to produce a change in electrical characteristic between
		the sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode."
		Unlike original patent claim 16, presented reissue claim 75 does not recite the language
		"quantitative measurement," and also does not recite the language "wherein the electrical
		conducting material of the first and second pump electrodes is substantially composed of
		noble metals."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
17	75	Unlike original patent claim 17, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also
		recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage," and also recites the language "the
		sensing electrode reacts with the gas to produce a change in electrical characteristic between
		the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 17, presented reissue claim 75 does not recite the language
		"quantitative measurement," and also does not recite the language "wherein the electrical conducting material of the first and second numb electrodes is substantially composed of
		conductive hydrated metal oxides."
		Unlike original patent claim 18, presented reissue claim 75 recites the language "a non-
18	75	biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also
		recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any hissing voltage", and also recites the language "the
		sensing electrode reacts with the gas to produce a change in electrical characteristic between
		the sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode."
		Unlike original patent claim 18, presented reissue claim 75 does not recite the language
		"quantitative measurement," and also does not recite the language "wherein at least one of
		the first and second pump electrodes is comprised of a film having a thickness in the range
		of about 50 Angstroms to 10,000 Angstroms.

Differences in Claim Language	Unlike original patent claim 19, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 19, presented reissue claim 75 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrical conducting material of said first and second pump electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material."	Unlike original patent claim 20, presented reissue claim 75 recites the language "a nonbiased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 20, presented reissue claim 75 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for both the first and second pump electrodes is a copolymer having a tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."
Presented Reissue Claim	75		75	
Original Patent Claim	19		20	

Presented Differences in Claim Language Reissue Claim	Unlike original patent claim 21, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 21, presented reissue claim 75 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the first pump electrode is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for the first pump electrode is 1 to 50 wt % of platinum."	Unlike original patent claim 22, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 22, presented reissue claim 75 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for the second pump electrode is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for the second pump electrode is 1 to 50 wt % of Ru oxide."
Original Patent Claim	21		22	

Original	Presented	Differences in Claim Language
ratent Claim	Reissue Ciailli	Inlike original natent claim 23 presented reisone claim 75 recites the language 6, and hinged
23	75	electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		absence of any biasing voltage," and also recites the language "the sensing electrode reacts with the
		gas to produce a change in electrical characteristic between the sensing electrode and the counter
		ciccuous in the appealed of an applied voltage to the sensing ciccuous.
		Unlike original patent claim 23, presented reissue claim 75 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the electrochemical gas sensor further
-		comprises: a second protonic conductive electrolyte membrane permeable to water vapor; first and
		second pump electrodes permeable to water vapor and comprised of an electron conductive material,
	<del></del>	and being separate from said sensing and counter electrodes and situated on opposite sides of and in
		contact with said second protonic conductive electrolyte membrane, said means for exposing a
		surface of said counter electrode to said water vapor exposing a surface of said second pump
		electrode to said water vapor, and said first pump electrode having a surface exposed to the ambient
		atmosphere; and means for applying a DC power across said second protonic electrolyte membrane,
		said first and second pump electrodes having in electrical connection therebetween said means for
		applying DC power across said second protonic electrolyte membrane; whereby the gas is transported
		away from the counter electrode when the DC power means applies a DC power to the first and
		second pump electrodes."
		Unlike original patent claim 24, presented reissue claim 75 recites the language "a non-biased
24	75	electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "said electrical measurement means detects changes in said electrical characteristic in the
		absence of any biasing voltage," and also recites the language "the sensing electrode reacts with the
	-	gas to produce a change in electrical characteristic between the sensing electrode and the counter
		electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 24, presented reissue claim /3 does not recite the language "quantitative"
		measurement," and also does not recite the language "wherein the second protonic conductive
		electrolyte inclinitatic is substantially composed of a sofity, permittingly, for the electrolyte inclinition and a sofity, permitting the property of the electrolyte inclinition and the ele

Naim	Fresented	Differences in Claim Language
	Reissue Claim	
25	75	Unlike original patent claim 25, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also
		recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any hiasing voltage" and also recites the language "the
		sensing electrode reacts with the gas to produce a change in electrical characteristic between
		the sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode."
		Unlike original patent claim 25, presented reissue claim 75 does not recite the language
		"quantitative measurement," and also does not recite the language "wherein the second
		protonic conductive electrolyte membrane is a hydrated metal oxide protonic conductor
		electrolyte membrane."
		Unlike original patent claim 26, presented reissue claim 75 recites the language "a non-
26	75	biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also
		recites the language "said electrical measurement means detects changes in said electrical
		characteristic in the absence of any biasing voltage," and also recites the language "the
-	-	sensing electrode reacts with the gas to produce a change in electrical characteristic between
		the sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode."
		Unlike original patent claim 26, presented reissue claim 75 does not recite the language
		"quantitative measurement," and also does not recite the language "wherein the surface area
		of the suitace of said first pullify electrode that is exposed to the amorent authosphere is
		said water vapor, whereby the second protonic conductive electrolyte membrane is exposed
	-	to substantially 100 percent relative humidity, and a positive pressure of said water vapor
-		exists from the surface of said second pump electrode that is exposed to said water vapor to
•		the surface of said first pump electrode that is exposed to the ambient atmosphere."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
27	75	Unlike original patent claim 27, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 27, presented reissue claim 75 does not recite the language "quantitative measurement," and also doe snot recite the language "wherein the surface area of the surface of the second pump electrode that is exposed to said water vapor is separated from said means for exposing a surface of said counter electrode to said water vapor by a hydrophobic membrane permeable to water vapor and substantially impervious to water."
28	75	Unlike original patent claim 28, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 28, presented reissue claim 75 does not recite the language "quantitative measurement," and also does not recite the language "further comprising: means for applying a DC pulse power source across the first protonic conductive membrane, said sensing and counter across the first protonic conductive membrane; and switch means for alternating the connection between the sensing and counter electrodes from the electrical measurement means to the DC pulse power means; whereby, in a positive ambient atmosphere concentration of said gas, said electrical measurement means detects changes in said electrical characteristic when said switch means connects said electrical measurement means to the sensing and counter electrodes; and whereby said DC pulse power means moves the gas away from a side of the gas sensor where the counter electrode is placed when said switch means connects said DC pulse power means to the sensing and counter electrodes."

Differences in Claim Language	Unlike original patent claim 29 presented reissue claim 75 recites the language "a non-	biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 29, presented reissue claim 75 does not recite the language "quantitative measurement," and also does not recite the language "wherein the gas is CO."	Unlike original patent claim 30, presented reissue claim 75 recites the language "a nonbiased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."  Unlike original patent claim 30, presented reissue claim 75 does not recite the language "quantitative measurement," and also does not recite the language "wherein the gas is NO _x ."
Presented	Keissue Claim	75		, 75 , 75
Original	Patent Claim	29		30

ited Differences in Claim Language	Claim	Unlike original patent claim 31, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also	recites the language "said electrical measurement means detects changes in said electrical	characteristic in the absence of any biasing voltage," and also recites the language "the	sensing electrode reacts with the gas to produce a change in electrical characteristic between	the sensing electrode and the counter electrode in the absence of an applied voltage to the	Schaing circuloue.	Unlike original patent claim 31, presented reissue claim 75 does not recite the language	"quantitative measurement," and also does not recite the language "wherein the gas is hydrogen."	nyarogen.	Ω		recites the language "said electrical measurement means detects changes in said electrical	characteristic in the absence of any biasing voltage," and also recites the language "the	sensing electrode reacts with the gas to produce a change in electrical characteristic between	the sensing electrode and the counter electrode in the absence of an applied voltage to the	sensing electrode."	I In it a priming a patent claim 32 presented reissue claim 75 does not recite the language	"quantitative measurement," and also does not recite the language "wherein the gas is H ₂ S."	
Presented	Reissue Claim	75										75								
Original	Patent Claim	31								,		32								

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
33	75	Unlike original patent claim 33, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also
		recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage," and also recites the language "the
		sensing electrode reacts with the gas to produce a change in electrical characteristic between
		the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 33, presented reissue claim 75 does not recite the language
		"quantitative measurement," and also does not recite the language "wherein the gas is H ₂ O vapor."
		Unlike original patent claim 34, presented reissue claim 75 recites the language "a non-
34	75	biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also
		recites the language "said electrical measurement means detects changes in said electrical
		sensing electrode reacts with the gas to produce a change in electrical characteristic between
		the sensing electrode and the counter electrode in the absence of an applied voltage to the
		sensing electrode."
		Unlike original patent claim 34, presented reissue claim 75 does not recite the language
		qualititative incasurement, and also does not recire die fanguage, wherein die gas is alcohol vapor."

Differences in Claim Language	Unlike original patent claim 35, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 35, presented reissue claim 75 does not recite the language "quantitative measurement," does not recite the language "a second protonic conductive electrolyte membrane permeable to water vapor;" does not recite the language "and said first pump electrode having a surface exposed to the ambient atmosphere, said second pump electrode being separated from said counter electrode by said means for exposing a surface of said second pump electrode to said water vapor, and said counter electrode having a surface exposed to said water vapor by said means for exposing a surface of said second protonic electrolyte membrane in electrical contact with said first and second pump electrodes; whereby the gas is transported away from the counter electrode when the DC power means applies a DC power across said second protonic electrolyte membrane."	Unlike original patent claim 36, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 36, presented reissue claim 75 does not recite the language "quantitative measurement," and also does not recite the language "wherein at least one of said first and second protonic conductive electrolyte membranes is substantially comprised of a solid, perfluorinated, ion-exchange polymer."
Presented Reissue Claim	75		7.5	
Original Patent Claim	35		36	

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
37	75	Unlike original patent claim 37, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the
		conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second
		said electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing
		electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 37, presented reissue claim 75 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein at least one of the first and second protonic conductive electrolyte membranes is a hydrated metal oxide protonic conductor electrolyte membranes."
38	75	gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the
		electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second
		electrical conductor material," also recites the language "said electrical measurement means detects changes in
		electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and
		the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 38, presented reissue claim 75 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein the surface of said first pump electrode that is
		exposed to the ambient atmosphere has a surface area smaller than the surface area of the surface of the second number electrode that is exposed to said water vanor, and wherein the surface of said sensing electrode that is
		exposed to the ambient atmosphere has a surface area smaller than the surface area of the surface of the counter
		electrode that is exposed to said water vapor, whereby the first protonic conductive electrolyte membrane is
		exposed to substantially 100 percent relative humidity, a positive pressure of said water vapor exists from the surface of said counter electrode that is exposed to said water vapor to the surface of said sensing electrode that
		is exposed to the ambient atmosphere, the second protonic conductive electrolyte membrane is exposed to
		substantially 100 percent relative humidity, and a positive pressure of said water vapor exists from the surface
		of said second pump electrode that is exposed to said water vapor to the surface of said first pump electrode
		that is caposed to the amount atmosphere.

Original Patent Claim	Presented Reissue Claim	Unlike original patent claim 39, presented reissue claim 75 recites the language "a non-biased
39	75	electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," also recites the
		language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 39, presented reissue claim 75 does not recite the language "quantitative measurement," and also does not recite the language "wherein the surface area of each of the surfaces of the second pump and counter electrodes that are exposed to said water vapor by said means for exposing a surface of said second pump electrode to said water vapor are each separated from said means for exposing a surface of said second pump electrode to said water vapor by a hydrophobic membrane permeable to water vapor and substantially impervious to water."
40	75	Unlike original patent claim 40, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor
		material and 50-90 wt % of a first and a second electrical conductor material," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 40, presented reissue claim 75 does not recite the language "quantitative measurement," and also does not recite the language "wherein said means for exposing a surface of said second pump electrode to said water vapor further contains an antifreeze additive."

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
41	75	
,		language "said electrical measurement means detects changes in said electrical characteristic in the
		absence of any biasing voltage," and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter
		electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 41, presented reissue claim 75 does not recite the language
		surfaces of said first protonic conductive electrolyte membrane in contact with one of the sensing
		and counter electrodes is substantially nonplanar, and wherein at least one of the surfaces of said second protonic conductive electrolyte membrane in contact with one of the first and second pump
	:	electrodes is substantially nonplanar."
		Unlike original patent claim 42, presented reissue claim 75 recites the language "a non-biased
42	75	electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "wherein the electrical conducting material of at least one of said sensing and counter
		u_a
		material and 50-90 wt % of a first and a second electrical conductor material," also recites the
	- <del></del>	
		absence of any biasing voltage," and also recites the language "the sensing electrode reacts with the
		electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 42, presented reissue claim 75 does not recite the language
		"quantitative measurement," and also does not recite the language "wherein at least one of the
		sensing, counter, first pump, and second pump electrodes is comprised of film having a thickness in the range of about 50 Anostroms to 10 000 Anostroms."
		dividing of moder of this course of this course

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
43	75	Unlike original patent claim 43, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
	·	language "wherein the electrical conducting material of at least one of said sensing and counter
		electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-00 wt % of a first and a second electrical conductor material " also recites the
		absence of any biasing voltage," and also recites the language "the sensing electrode reacts with the
		gas to produce a change in electrical characteristic between the sensing electrode and the counter
		electrode in the absence of an applied voitage to the sensing electrode.
		Unlike original patent claim 43, presented reissue claim 75 does not recite the language
		"quantitative measurement," and also does not recite the language "wherein the film is substantially composed of a noble metal."
		Unlike original patent claim 44, presented reissue claim 75 recites the language "a non-biased
44	75	electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "wherein the electrical conducting material of at least one of said sensing and counter
		electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor
		material and 50-90 wt % of a first and a second electrical conductor material," also recites the
		language "said electrical measurement means detects changes in said electrical characteristic in the
		absence of any biasing voltage," and also recites the language "the sensing electrode reacts with the
		gas to produce a change in electrical characteristic between the sensing electrode and the counter
	· · · · · · · · · · · · · · · · · · ·	electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 44, presented reissue claim 75 does not recite the language
		"
		pladnum.

Original Potent Claim	Presented Peisone Claim	Differences in Claim Language
45	75	Unlike original patent claim 45, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," also recites the
		() C
		gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		$\sim$ $\sim$
		sensing, counter, first pump, and second pump electrodes is substantially comprised of proton conductive material."
46	75	Unlike original patent claim 46, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
?	<u>.</u>	language "wherein the electrical conducting material of at least one of said sensing and counter
		electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," also recites the
		47.
		gas to produce a change in electrical characteristic between the sensing electrode and the counter
		GICCHOUG III UIC AUSCIICC OI AII APPIICU VOITABE TO UIC SCHSIIIB CICCHOUC.
		Unlike original patent claim 46, presented reissue claim 75 does not recite the language "quantitative measurement," and also does not recite the language "wherein at least one of the first
		and second protonic conductive electrolyte membranes is substantially comprised of a solid, perfluorinated, ion-exchange polymer."

Original Patent Claim	Presented Reissue Claim	Differences in Claim Language
47	75	Unlike original patent claim 47, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
		language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," also recites the
		language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrode reacts with the
		gas to produce a change in electrical characteristic between the sensing electrode and the confidence of an applied voltage to the sensing electrode."
		Unlike original patent claim 47, presented reissue claim 75 does not recite the language "quantitative measurement," and also does not recite the language "wherein at least one of the first
		and second protonic conductive electrolyte membranes is a hydrated metal oxide protonic conductive electrolyte membrane."
48	75	Unlike original patent claim 48, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conducting material of at least one of earl conducting materials."
		electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," also recites the
		- עם
		gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 48, presented reissue claim 75 does not recite the language "quantitative measurement," and also does not recite the language "wherein the electrical
		conducting material of at least one of said sensing, counter, first pump, and second pump electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material
		and 30-30 Wt 70 Ut a thist and a second cieculical conductor material.

Presented Differences in Claim Language Reissue Claim	Unlike original patent claim 49, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 49, presented reissue claim 75 does not recite the language "quantitative measurement," and also does not recite the language "wherein the proton conductor material for said at least one of the sensing, counter, first pump, and second pump electrodes is a copolymer having a tetrafluoroethylene backbone with a side chain of perfluorinated monomers containing at least one of a sulfonic acid group or a carboxylic acid group."	Unlike original patent claim 50, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 50, presented reissue claim 75 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing, counter, first pump, and second pump electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one
Pres Reissu				
Original Patent Claim	49		90	

Original	Presented	Differences in Claim Language
Patent Claim	Reissue Claim	
51	75	Unlike original patent claim 51, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical
		conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical
•		conductor material," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrical characteristic in the language electrical characteristic in the language electrical characteristic ele
		electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the
		counted electrode in the absence of an applica voltage to the sensing electrode.
		Unlike original patent claim 51, presented reissue claim 75 does not recite the language "quantitative
		measurement," and also does not recite the language "wherein one of the first and second electrical conductor
		materials for said at reast one of the first and second electrical conductor materials for said at least one of the
		sensing, counter, first pump, and second pump electrodes is about 1-50 wt % of Ru oxide."
		Unlike original patent claim 52, presented reissue claim 75 recites the language "a non-biased electrochemical
52	75	gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical
		conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10, 50 art % of a proton conductor material and \$0.00 art % of a first and a second electrical
		conductor material," also recites the language "said electrical measurement means detects changes in said
		electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing
-		electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the
		counter electrode in the absence of an applied voltage to the sensing electrode."
		Unlike original patent claim 52, presented reissue claim 75 does not recite the language "quantitative
		measurement," and does not recite the language "a reference electrode permeable to water vapor and comprised
		of an electrical conducting material; a counter electrode permeable to water vapor and comprised of an electrical
		ambient atmosphere; a protonic conductive electrolyte membrane permeable to water vapor, having top and
		_
		and the top side of said protonic conductive membrane being in contact with the sensing and reference
		electrodes;" and also does not recite the language "wherein the electrical conducting material of at least one of
		said sensing, counter, and reference electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material "
		or a proton common mass of the first and the first of the

Unlike original patent claim 53, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conducting material of at least one of said sensing and counter electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electricd brancteristic in the absence of any biasing voltage," and also recites the language "the sensing electricd characteristic in the absence of an applied voltage to the sensing electrode."  Unlike original patent claim 53, presented reissue claim 75 does not recite the language "quantitative measurement," and also does not recite the language "further comprising; means for applying a DC power across said protonic electrolyte membrane in electrical contact between the sensing electrode and said counter electrode, whereby the gas is transported away from the counter electrode when the DC power means applies a DC power across said protonic electrolyte membrane."  Unlike original patent claim 54, presented reissue claim 75 recites the language "a nor-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conducting material and so 90.90 ut % of a first and a second electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrode material and so 90.90 ut % of a first and a second electrical characteristic in the absence of any biasing voltage," and also recites the language "was different measurement means ageted the language electrode and absence of an applied voltage to the sensing electrode. "Wherein the gas to proton-gas in said electrode and electrode of said said vater vanor further contains an antiferze addition."	Original Patent Claim	Presented Reissue Claim	Differences in Claim Language
. 75	53	75	Unlike original patent claim 53, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
75			
75			"said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrode reacts with the gas to produce
75			a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."
75			Unlike original patent claim 53, presented reissue claim 75 does not recite the language "quantitative
75			measurement," and also does not recite the language "further comprising: means for applying a DC power across said protonic electrolyte membrane in electrical contact between the sensing electrode and
75			said counter electrode, whereby the gas is transported away from the counter electrode when the DC nower means applies a DC nower across said protonic electrolyte membrane."
7.5			Unlike original patent claim 54, presented reissue claim 75 recites the language "a non-biased
language "wherein the electrical conducting material of at least one of said sensing and coun electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton condumaterial and 50-90 wt % of a first and a second electrical conductor material," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence any biasing voltage," and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in absence of an applied voltage to the sensing electrode."  Unlike original patent claim 54, presented reissue claim 75 does not recite the language "quantita measurement," and also does not recite the language "wherein said means for exposing a surface of counter electrode to said water vanor further contains an antifreeze additive."	54	75	electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the
material and 50-90 wt % of a first and a second electrical conductor material," also recites the language "the sensing electrode reacts with the gas to prod a change in electrical characteristic between the sensing electrode and the counter electrode in absence of an applied voltage to the sensing electrode."  Unlike original patent claim 54, presented reissue claim 75 does not recite the language "quantita measurement," and also does not recite the language "wherein said means for exposing a surface of counter electrode to said water vanor further contains an antifreeze additive."			language "wherein the electrical conducting material of at least one of said sensing and counter alectrodes is a proton-electron mixed conductive material having 10.50 wt % of a proton conductor
"said electrical measurement means detects changes in said electrical characteristic in the absence any biasing voltage," and also recites the language "the sensing electrode reacts with the gas to prod a change in electrical characteristic between the sensing electrode and the counter electrode in absence of an applied voltage to the sensing electrode."  Unlike original patent claim 54, presented reissue claim 75 does not recite the language "quantita measurement," and also does not recite the language "wherein said means for exposing a surface of a counter electrode to said water vanor further contains an antifreeze additive."			material and 50-90 wt % of a first and a second electrical conductor material," also recites the language
any biasing voltage," and also recites the language "the sensing electrode reacts with the gas to prod a change in electrical characteristic between the sensing electrode and the counter electrode in absence of an applied voltage to the sensing electrode."  Unlike original patent claim 54, presented reissue claim 75 does not recite the language "quantita measurement," and also does not recite the language "wherein said means for exposing a surface of a counter electrode to said water vanor further contains an antifreeze additive."			"said electrical measurement means detects changes in said electrical characteristic in the absence of
			any biasing voltage," and also recites the language "the sensing electrode reacts with the gas to produce
Unlike original patent claim 54, presented reissue claim 75 does not recite the language "quantita measurement," and also does not recite the language "wherein said means for exposing a surface of a measurement," and also does not recite the language "wherein said means for exposing a surface of a measurement," and also does not recite the language "wherein said means for exposing a surface of a measurement,"			
Unlike original patent claim 54, presented reissue claim 75 does not recite the language "quantita" measurement," and also does not recite the language "wherein said means for exposing a surface of a counter electrode to said water vapor further contains an antifreeze additive."			
counter electrode to said water vapor further contains an antifreeze additive."			Unlike original patent claim 54, presented reissue claim 75 does not recite the language "quantitative measurement" and also does not recite the language "wherein said means for exposing a surface of said
CONTINI ADALITATION THE CITATION TATE TO THE TATE OF THE CONTINION OF THE CONTINEON OF THE			counter electrode to said water vapor further contains an antifreeze additive."

Differences in Claim Language	Unlike original patent claim 55, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	measurement," and also does not recite the language "wherein the surface of said sensing electrode that is exposed to the ambient atmosphere has a surface area smaller than the surface area of the surface of the counter electrode that is exposed to said water vapor, whereby the first protonic conductive electrolyte membrane is exposed to substantially 100 percent relative humidity, and a positive pressure of said water vapor exists from the surface of said counter electrode that is exposed to said water vapor to the surface of said sensing electrode that is exposed to the ambient atmosphere."  Unlike original patent claim 56, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical	conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."  Unlike original patent claim 56, presented reissue claim 75 does not recite the language "quantitative measurement," and also does not recite the language "wherein at least one of the surfaces of said protonic conductive electrolyte membrane in contact with one of the sensing, counter, and reference electrodes is substantially nonplanar."
Presented Reissue Claim	75	S L	
Original Patent Claim	55	73	

Differences in Claim Language	<del> </del>	language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," also recites the language	"said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrode reacts with the gas to produce	a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 57, presented reissue claim 75 does not recite the language "quantitative	measurement, and also does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing, counter, first pump, and second pump electrodes	is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials	for said at least one of the sensing, counter, first pump, and second pump electrodes is about 1-50 wt 70 of Ru oxide."	Unlike original patent claim 58, presented reissue claim 75 recites the language "a non-biased	electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the	electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor	material and 50-90 wt % of a first and a second electrical conductor material," also recites the language	"said electrical measurement means detects changes in said electrical characteristic in the absence of	any biasing voltage," and also recites the language "the sensing electrode reacts with the gas to produce	a change in electrical characteristic between the sensing electrode."	TITILE CONTRACTOR CONT	measurement," and also does not recite the language "wherein at least one of the sensing, counter, and	reference electrodes is comprised of film having a thickness in the range of about 50 Angstroms to	10,000 Aligstollis.
Presented Reissue Claim	75									75									
Original Patent Claim	57									58									

75	Original	Presented	Differences in Claim Language
75	r atcitt Ciaiiii	Neissue Ciaini	Unlike original patent claim 59, presented reissue claim 75 recites the language "a non-biased
75	59	75	electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor
75			
75			any biasing voltage," and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the
75			absolice of an applica voltage to the sensing electrode.
75			Unlike original patent claim 59, presented reissue claim 75 does not recite the language "quantitative measurement" and also does not recite the language "wherein the film is substantially composed of a
7.5			noble metal."
Q	(	ţ	Unlike original patent claim 60, presented reissue claim 75 recites the language "a non-biased
electrodes is a proton-electron mixed conductive material having 10-50 material and 50-90 wt % of a first and a second electrical conductor mate "said electrical measurement means detects changes in said electrical clany biasing voltage," and also recites the language "the sensing electrode and a change in electrical characteristic between the sensing electrode and absence of an applied voltage to the sensing electrode."  Unlike original patent claim 60, presented reissue claim 75 does not real modern and also does not real the language "the real bands to the noble of the profile of the sensing electrode."	09	ς,	electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter
"said electrical measurement means detects changes in said electrical cany biasing voltage," and also recites the language "the sensing electrode a change in electrical characteristic between the sensing electrode and absence of an applied voltage to the sensing electrode."  Unlike original patent claim 60, presented reissue claim 75 does not remanded to the paragraphs of the paragraphs.			electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor
any biasing voltage," and also recites the language "the sensing electrode and a change in electrical characteristic between the sensing electrode and absence of an applied voltage to the sensing electrode."  Unlike original patent claim 60, presented reissue claim 75 does not reconstructed the language "the roble of the popular content the language."			material and 50-90 wt % of a first and a second electrical conductor material," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of
a change in electrical characteristic between the sensing electrode and absence of an applied voltage to the sensing electrode."  Unlike original patent claim 60, presented reissue claim 75 does not red			any biasing voltage," and also recites the language "the sensing electrode reacts with the gas to produce
Unlike original patent claim 60, presented reissue claim 75 does not red			a change in electrical characteristic between the sensing electrode and the counter electrode in the
Unlike original patent claim 60, presented reissue claim 75 does not rec			absence of an applied voltage to the sensing electrode."
III Gasul Cilical, allu also uocs iloi i culti i aliguago minerali uis ilouso il			Unlike original patent claim 60, presented reissue claim 75 does not recite the language "quantitative measurement," and also does not recite the language "wherein the noble metal is platinum."

Differences in Claim Language	Unlike original patent claim 61, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrode reacts with the gas to produce a change in electrical characteristic between the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."	Unlike original patent claim 61, presented reissue claim 75 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is substantially comprised of a solid, perfluorinated, ion-exchange polymer."	Unlike original patent claim 62, presented reissue claim 75 recites the language "a non-biased electrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conductive material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."  Unlike original patent claim 62, presented reissue claim 75 does not recite the language "quantitative measurement," and also does not recite the language "wherein the protonic conductive electrolyte membrane is a hydrated metal oxide protonic conductor electrolyte membrane."
Presented Reissue Claim	75		75
Original Patent Claim	61		62

Differences in Claim Language		clectrochemical gas sensor for measurement of a gas in an ambient atmosphere," also recites the language "wherein the electrical conducting material of at least one of said sensing and counter electrodes is a proton-electron mixed conductive material having 10-50 wt % of a proton conductor material and 50-90 wt % of a first and a second electrical conductor material," also recites the language "said electrical measurement means detects changes in said electrical characteristic in the absence of any biasing voltage," and also recites the language "the sensing electrode and the counter electrode in the absence of an applied voltage to the sensing electrode."  Unlike original patent claim 65, presented reissue claim 75 does not recite the language "quantitative measurement," and also does not recite the language "wherein one of the first and second electrical conductor materials for said at least one of the sensing, counter, and reference electrodes is about 50-99 wt % of carbon black, and the other of the first and second electrical conductor materials for said at least one of the sensing, counter, and reference electrodes is about 1-50 wt % of Ru oxide."	
Presented	Patent Claim   Reissue Claim	75	
Original	Patent Claim	99	- 7